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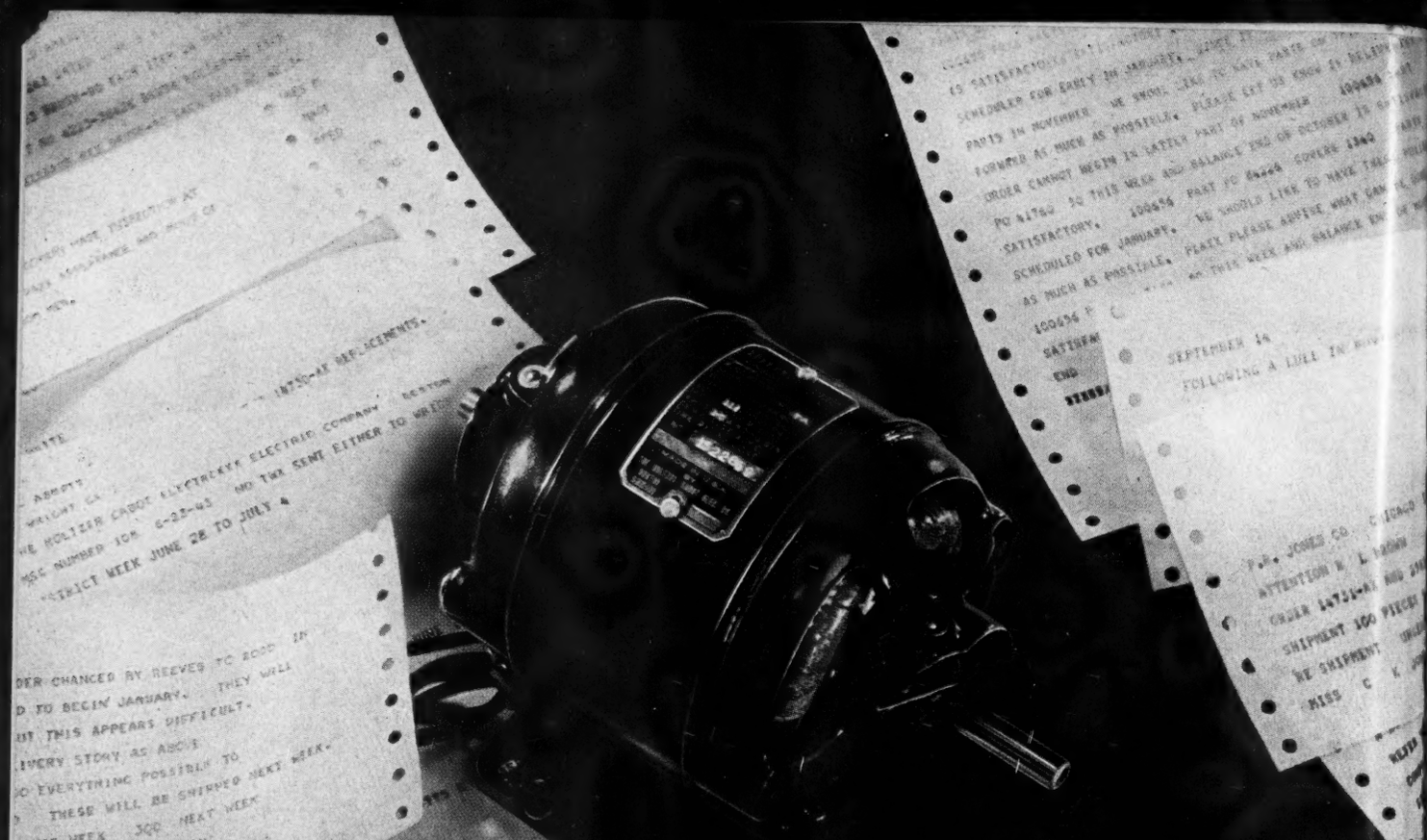

Uniform, Synchronous Speed at Every Station

Teletype Machine powered with a Holtzer-Cabot motor

Electric motors driving the intricate mechanisms of machines that transmit and record messages verbatim must have identical operating characteristics at every station. Since standard "off-the-shelf" motors cannot meet the strict performance requirements, such as uniform, synchronous speed, quietness, load cycles, etc., the solution is a special motor designed to exactly meet the particular operating conditions.

For over 50 years Holtzer-Cabot has designed and built special motors to fit the application. Many machines such as teletype machines, and other sending and receiving equipment are Holtzer-Cabot powered. Although, today, all of our plant facilities are being utilized for building special fractional H.P. motors for military use, our motor development engineers will gladly discuss your post-war motor requirements with you. No obligation of course.

SPECIAL MOTORS DESIGNED TO FIT THE APPLICATION

HOLTZER-CABOT

Division of First Industrial Corporation

Designers and Builders of Special Fractional HP Motors and Electrical Apparatus

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VOL. 3 NO. 10

fueloil & oil heat

FEBRUARY 1945

Names in the News

John W. Pauling, vice-president of the Minneapolis-Honeywell Regulator Co., who was widely known in the heating industry, died suddenly January 17 while in Chicago on business, aged 55. He suffered a heart attack. *Mr. Pauling* was born in Blackburn, Mo., and joined Minneapolis-Honeywell as a salesman in 1923, after operating his own business in the heating field in St. Louis. He is survived by his widow, Loretta Pauling, and two sons, Stanley and William, both in the Army.

Mrs. Alexis Doster, wife of the vice president and secretary of the Torrington Mfg. Co., Torrington, Conn., died at the Waterbury (Conn.) Hospital, January 27, following a brief illness. Services on January 28, were private. Mr. and Mrs. Doster lost their son, Paratrooper First Lieutenant Alexis Doster, Jr., a year ago after a brilliant military career which recently was the subject of a *Saturday Evening Post* article.

C. Allen Fisk has joined the Williams Oil-O-Matic Heating Corp., Bloomington, Ill., as Divisional Manager for New England with headquarters in Boston, Mass. *Mr. Fisk* brings to Williams Oil-O-Matic Heating Corp. more than twenty years of intensive sales experience in the oilburner industry. *Mr. Fisk* will operate under the direction of C. W. *Cornelssen*, recently appointed Manager of Heating Sales.

Ed Fahey, formerly eastern manager for Ray Oil Burner Co., San Francisco,

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YOU THINK HE'S SILLY?

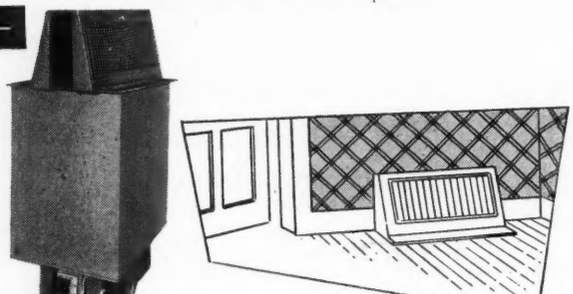
(Well, there are others)

Buying an overcoat that's too big is no sillier than buying an oil furnace that's too big, which plenty of people have done. Here's why they do it: 1—They want the comfort, convenience and economy of automatic oil heat. 2—But their local heating equipment dealer cannot offer them an oil furnace which is **small enough** for their requirements.

Realizing this, the H. C. Little Burner Co. began some years ago to specialize in automatic oil heat for small homes (75% of the total American heating market). Starting with a really revolutionary oil burner, of the vaporizing type, they gradually developed a complete line of equipment. TODAY

H. C. Little leads the field, with the only fully automatic electric ignition natural draft vaporizing type burner available in a complete line, including Conversion Burners, Floor Furnaces, Basement Furnaces, Utility Room Furnaces, Space Heaters, Water Heaters, Wall Furnaces, etc.

FOR EXAMPLE—



Pictured above is an H. C. Little oil burning **Dual Register Floor Furnace,** especially designed for **small** homes. Complete, factory assembled, easy to install, it has a big postwar future. Located directly under a partition wall, as illustrated, it draws cold air in at the floor level and discharges warm air into the "living zone" of the rooms on **both sides** of the partition. It conserves floor space and has a neat, attractive appearance. With thermostatic control, its operation is entirely automatic.

THIS MAKES SENSE — Find out more about this Dual Register Floor Furnace and its postwar sales possibilities. Write for our new booklet "How to Get Real Profits in Postwar Heating."

H. C. LITTLE Burner Co.
HEAD OFFICE: SAN RAFAEL, CALIF.
Branches in Principal Cities

Cal., has now joined York-Shipley, Inc., York, Pa. He will be in charge of the Middle Atlantic and Southern Atlantic states Industrial Division.

John Barclay, who has been with The Heil Co., Milwaukee, Wisc. for many years, will be director of their new offices in Seattle. The new office is to provide on-the-spot sales assistance for Heil dealers and distributors in Washington, Oregon, Montana, Idaho and Wyoming.

E. H. Davison has been appointed assistant manager of heating sales of Williams Oil-O-Matic Heating Corp., Bloomington, Ill. *Mr. Davison* has had more than twenty-two years' experience in the oil-burner industry. He has been regional manager since 1941.

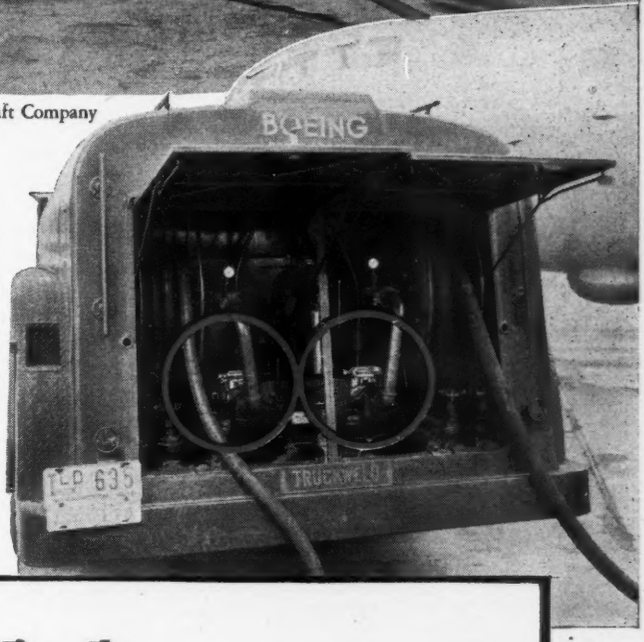
Stewart Coleman has resigned as director of the PAW program division, and has been succeeded by *Howard W. Page,* who is promoted from the post of assistant director. *Jerry A. Cogan* becomes the associate division director instead of assistant. *Mr. Coleman,* who is returning to Standard of New Jersey, was the first director of the program division.

John H. Middlekamp, who recently resigned as director of the Automotive Division of the War Production Board has been appointed manager of the Government Department of Mack Trucks, Inc., New York.

Ellis L. Redden, who has been advertising and sales promotion manager for the past five years for the National Radiator Co., Johnstown, Pa., has now joined McCann-Erickson, Inc. advertising agency, Rockfeller Plaza, New York. He has been appointed assistant to the vice-president of merchandising and sales promotion.

FUELING THE B-29 SUPERFORTRESS CALLS FOR EXACT GALLONAGE MEASUREMENT

Photo: Courtesy Boeing Aircraft Company



No spot on earth is beyond the reach of the B-29 Superfortress. The fact that these giant dreadnaughts of the air will carry more bombs, faster, higher and for greater distances — releasing their destructive loads exactly where and when planned, is due in large measure to their tremendous fuel carrying capacity. Fuel loads, therefore, must be accurately known to insure the successful accomplishment of long range missions.

Views above show tank truck equipped with dependably accurate Brodie Meters fueling a new B-29 Superfortress for its maiden flight.

BRODIE METERS

PETROLEUM METERING EXCLUSIVELY

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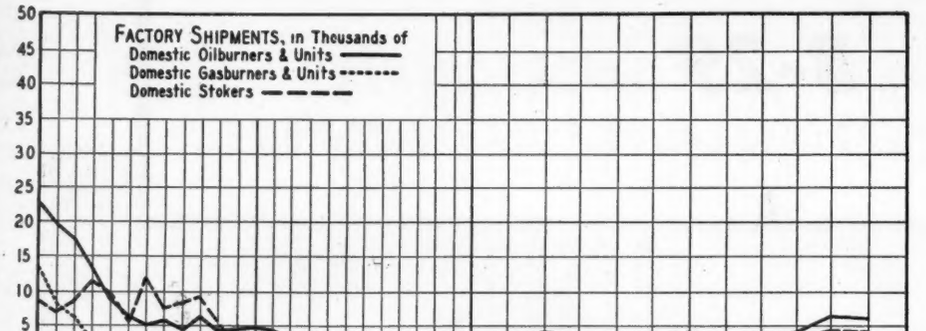
KEEP 'EM FLYING — SINCE 1927 — BY BUYING MORE BONDS

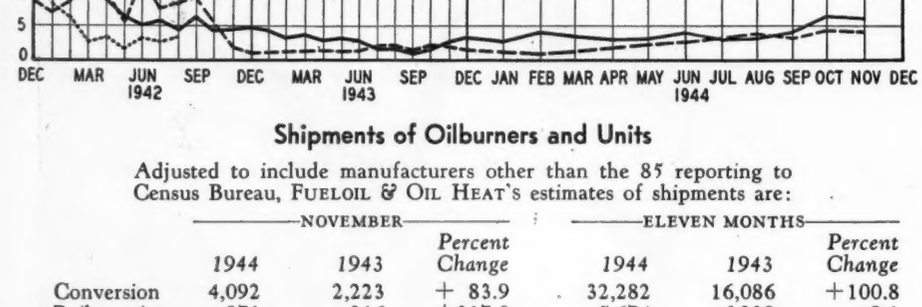
fuel oil & oil heat


FACTORY SHIPMENTS, in Thousands of
Domestic Oilburners & Units
Domestic Gasburners & Units
Domestic Stokers
DEC MAR JUN SEP DEC MAR JUN SEP DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
1942 1943 1944

Shipments of Oilburners and Units

Adjusted to include manufacturers other than the 85 reporting to Census Bureau, FUELOIL & OIL HEAT's estimates of shipments are:

	NOVEMBER			ELEVEN MONTHS		
	1944	1943	Percent Change	1944	1943	Percent Change
Conversion	4,092	2,223	+ 83.9	32,282	16,086	+100.8
Boiler units	871	216	+317.0	5,674	6,238	— 9.1
Furnace units	959	238	+316.1	5,067	5,174	— 2.1
All domestic	5,922	2,677	+121.6	42,023	27,498	+ 52.9
Commercial	2,660	7,688	— 65.5	29,322	46,028	— 36.3
Total	8,582	10,365	— 17.8	72,345	73,526	— 1.6


STOCKS OF DOMESTIC OILBURNERS AND UNITS
(in Thousands) End of Month Shown
Factory Stocks
Dealer Stocks
JUN SEP DEC MAR JUN SEP DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
1942 1943 1944

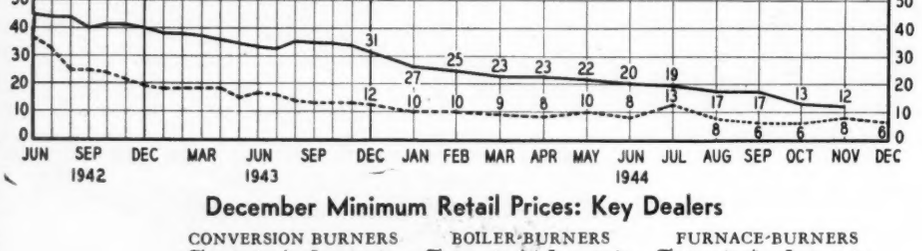
December Minimum Retail Prices: Key Dealers

	CONVERSION BURNERS		BOILER-BURNERS		FURNACE-BURNERS	
	Top price*	Low price	Top price*	Low price	Top price*	Low price
Highest	$358	$195	$625	...	$625	...
Lowest	210	160	425	...	425	...
Dec. Aver.	280	174	540	...	492	...
Nov. Aver.	272	185	423	$354	469	$357

*Top price key dealers for conversion burners are those whose minimum retail prices are $200 or more, for boiler-burner and furnace-burner units (exclusive of ductwork) those whose minimums are $400 or over.

Price Index: Conversion Burners: January 1940 is 100%

WHOLESALE				RETAIL			
December	114.8	Six months ago	115.0	December	113.0	Six months ago	114.0
November	113.3	Year ago	105.0	November	113.3	Year ago	110.0


INDEX OF BURNER PERMITS in 43 Cities
(Average of 1936-7-8=100)
INDEX OF NEW HOME PERMITS in 35 Cities
(Average of 1936-7-8=100)
Both indexes adjusted for seasonal variation
DEC MAR JUN SEP DEC MAR JUN SEP DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
1942 1943 1944

Oilheating Trends

INSTALLATIONS OF DOMESTIC oilburners and units during December are estimated at 5,619, or more than three times the 1,682 installed in the same month the previous year. For the full year the estimate on the basis of monthly dealer reports is 48,265. This is remarkably close to the full year's estimate published in the January issue of FUELOIL & OIL HEAT of 49,915. The January issue figure is the better of the two, since it based upon the much larger survey made each year at the end of December, and is reconciled with factory shipments to dealers, changes in stock levels, etc. December shipments were divided: 77% conversion burners, 11% boiler-burner units and 12% furnace-burner units.

BURNER STOCKS: Dealer stocks of domestic burners and units at the end of December were approximately 5,800, compared with 7,900 a month previous and compared with 12,000 at the end of 1943. With factories shipping relatively few burners each month it is clear that a good many possible replacement sales will not be made in early months, for lack of burners to sell. Factory stocks at the end of November, the latest available reports, were 12,456 and at the start of November they were 13,316. Shipments during November were 5,922, so new production was apparently 5,062, or just about half of the number permitted under WPB's L-74.

SERVICE INCOME: Reporting dealers averaged $3,173 service department revenue in December, a 43% jump from the $2,216 reported by the same dealers in December 1943. Obviously, some of this rise is attributable to burner replacement sales in companies where these are credited to service department income rather than sales department. November service income of the reporting group averaged $2,608, October $3,168 and September $2,958. Total 12-month service income of the reporting group averaged $29,990, showing that they are relatively large dealers, since the average for all dealers (January FUELOIL & OIL HEAT) was $9,550.

HARDSHIP APPEALS: About 7% of all customers of the reporting dealers were given additional oil on hardship appeals up to the end of Period 2. They were given

an average of 123 gallons. Based upon the average size of central heating ration, a consumer out of oil and coupons by the end of period 2 had used at least 175 gallons too much, so he faces a stringency for the balance of the season. Many boards are not following Washington instructions to put these customers back on the beam, although they are not required to do this if they believe that the overconsumption was intentional. With supplies, particularly Eastern, getting critical, it is probable that boards generally will tend to minimize hand-outs.

The 7% reported as out of oil and coupons is not a measure of total overconsumption. A check at mid-December showed 37% burning oil faster than their rations permit, based on dealers' automatic delivery records.

A considerably larger number of dealers this season than last are keeping customers posted on how they stand in relation to their rations. Of all those reporting this month, 76% say they are operating a consumer advisory service. Some dealers, specifically in Boston and Baltimore, say that some of their consumers are not taking the consumer advisory service too seriously, in fact they are objecting to being told that they are burning oil too fast, pointing out that it is not the dealer's affair and that they will be able to get additional oil when they use up what they have. Fortunately, this is not a widespread attitude, but some of it was to be expected when the more complete advisory services were setup for this season.

FILING OPA FORM 1198: When OPA extended the deadline for filing the reconciliation form 1198 to December 31, rationing officials made it as plain as they could that this time the accounting must definitely be made and any dealers who did not file the form would immediately be investigated. However, of those reporting for this study, only 72% said that they did file the form, and the remaining 28% did not. One principal reason for not filing is the fact that the form called for figures in detail that some dealers could not readily get from their books, and if they were to file, it would require their going back through many transactions to assemble the data. As a result, they have again put it off.

OPA is now planning to get injunctions against the non-filing dealers, but it is problematical if courts will issue these without giving dealers further time to try and get their records in shape. Of those reporting who did file the forms, 71% reported a shortage, and 29% an overage of ration evidences. Shortages ranged from one-tenth of 1% to 2%, and the overages ranged from three-tenths of 1% to 1½%. These deviations from balance seem very conservative considering the vicissitudes of handling a rationing program, and the small variations may account for the prompt filing. Perhaps those that did not file will eventually show wider variations, and this may have influenced their non-filing attitude.

Oilburner* and Building Permits

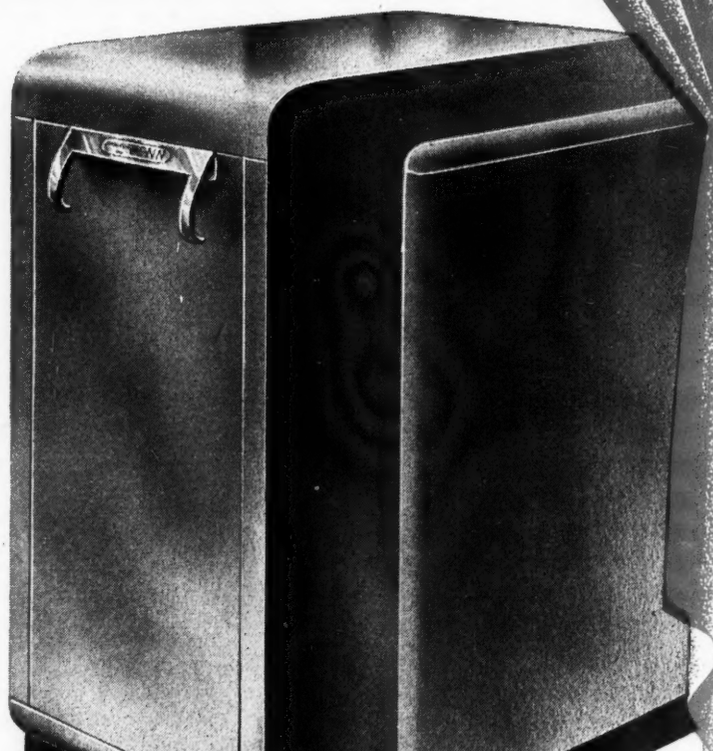
OILBURNERS					DWELLINGS			
December		12 MONTHS			December		12 MONTHS	
1944	1943	1944	1943		1944	1943	1944	1943
..	..	..	..	Baltimore, Maryland	53	100	..	1211
..	..	..	..	Binghamton, New York	0	1	1	1
..	..	..	..	Bloomfield, N. J.	0	1	..	2
..	..	..	..	Boston, Massachusetts	0	0	0	23
9	18	123	39	Bridgeport, Conn.	..	..	..	..
..	..	..	..	Buffalo, New York	0	4	..	336
..	..	..	..	Des Moines, Iowa	0	0	..	11
11	21	..	21	Detroit, Michigan	23	366	..	4878
7	2	..	9	Elizabeth, N. J.	0	0	..	54
16	5	..	15	Freeport, New York	..	..	..	..
..	..	..	..	Greenwich, Conn.	0	0	..	3
..	..	..	..	Hackensack, N. J.	0	0	..	0
5	3	..	..	Hartford, Conn.	..	..	..	..
4	0	18	2	Irvington, N. J.	0	0	8	13
2	3	..	10	Milwaukee, Wisc.	14	47	..	151
20	15	..	107	Minneapolis, Minn.	65	0	183	3
5	1	..	7	Montclair, N. J.	..	..	..	..
..	..	..	..	Morristown, N. J.	0	0	0	0
22	4	124	28	Mt. Vernon, New York	..	..	..	..
24	12	171	50	New Bedford, Mass.	..	..	..	..
5	1	43	6	New Haven, Conn.	..	..	..	..
0	0	3	7	New Orleans, La.	..	..	..	..
6	0	..	2	New Rochelle, N. Y.	0	0	1	0
53	7	..	62	Manhattan, Bronx, Rchd	..	..	..	..
7	2	..	155	Norfolk, Virginia	2	0	..	183
1	1	..	10	Oakland, Calif.	..	..	..	..
14	6	..	59	Omaha, Nebraska	14	15	45	114
0	0	3	1	Orange, New Jersey	0	0	0	2
11	1	67	9	Paterson, N. J.	1	0	4	32
..	..	..	..	Plainfield, N. J.	0	0	7	18
6	1	40	8	Portland, Maine	0	0	..	60
11	7	176	70	Portland, Oregon	11	190	..	1700
6	3	..	8	Providence, R. I.	0	0	1	0
..	..	..	..	Reading, Penna.	0	0	..	0
0	0	0	1	Richmond, Virginia	5	0	202	33
0	0	0	5	Rochester, N. Y.	..	..	..	..
6	3	39	10	Rockville Center, N. Y.	0	0	0	1
1	19	..	24	Salem, Massachusetts	0	0	..	0
9	2	69	57	St. Louis, Missouri	..	..	..	..
21	4	..	11	St. Paul, Minnesota	11	0	93	4
1	1	..	19	Schenectady, N. Y.	..	..	..	..
..	..	..	..	Seattle, Washington	60	192	740	1621
..	..	..	..	Springfield, Mass.	1	14	16	286
2	2	..	10	Stamford, Conn.	..	..	..	..
..	..	..	..	Syracuse, New York	0	4	22	62
..	..	..	..	Trenton, New Jersey	0	24	8	207
..	..	..	..	Utica, New York	0	0	31	0
23	1	..	37	Washington, D. C.	..	..	..	..
..	..	..	..	West Orange, N. J.	0	0	0	0
15	7	..	40	White Plains, N. Y.	0	0	0	0
2	2	24	6	Wilmington, Delaware	0	16	10	534
25	11	194	49	Worcester, Mass.	..	..	..	..
3	3	..	26	Yonkers, New York	..	..	..	..
353	168	1094	374	*Totals*	260	974	1372	2954
+110.0		+192.6		*Percent Change*	—73.4		—53.6	

*Permits are not total sales in each market since none are reported from suburban areas, which normally account for 20% to 60% of total sales in each market; nor are they an accurate index where enforcement is lax. Rightly used, however, they are a useful working index.

DEALER BULK STORAGE: As pointed out in the last issue, fueloil distributors were attempting to fill storage as much as possible, in view of the tightening supply outlook. Through the early fall, they had kept down to a fairly small working basis. Today, particularly in the East, many are not able to fill because their primary suppliers do not have the product. Forty-three per cent of those reporting this month, say they have been unable to get delivery on the amount of oil ordered to build up their own storage. Worst shortage areas seem to be New England and New York harbor regions.

THIS IS THE NEW

PENN PACKAGED BOILER-BURNER UNIT



NOW RELEASED FOR PRODUCTION

- **Completely Factory Pre-Fabricated**
- **Gas or Oil Fired Boiler Burner**
- **New, Improved Fire Travel For Better Heat Transfer . . . Low Stack Temperature**
- **New Penn "Volatoil" Feed Pre-Heats Oil For Peak Combustion Efficiency**
- **Unit Self Supporting . . . Needs No Foundation**
- **Installation Labor Cut Up to 90%**
- **No Basement Engineering Guesswork**

(A.G.A. Approved Gas Burner)

Penn Packaged Boiler-Burner Units, refined, improved and completely packaged, will soon be coming off the assembly lines.

Spot reconversion permits us to make a limited number during the early months of 1945. "Wrapped up" in a modern jacket, these new heating packages will put Penn Dealers far ahead in the field of sales.

Check the outstanding performance features listed above. Soon we'll show you exactly what's inside to back up our statements. (A cut-away detail illustration of this and other Penn Units will appear in an early advertisement.)

Dealers who are still looking for modern heating equipment . . . units that will be saleable as only a complete package can be . . . are invited to write or call us today. You'll find Penn an aggressive and cooperative manufacturer, thoroughly equipped to fill the demands for finer domestic heating.

BOILER BURNER UNITS
AIR CONDITIONER UNITS

Packaged by PENN

PENNGUN WATER HEATERS
HYDRO-AIRE (Split System)

PENN BOILER and BURNER MANUFACTURING CORP.
LANCASTER, PENNSYLVANIA

Gas Headache

Lid Off on Gasheating, But Equipment Scarcity Eases Threat

by
Robert Gray

In three recent industry gatherings in Eastern states the author has been asked to discuss current problems, with major emphasis on gas competition. Interest in this subject is whetted by the all-too-evident expansion in gas home heating installations. Some of the thoughts expressed in the talks are here reproduced. Within the past year two other articles by the author on the same general subject have appeared in FUELOIL & OIL HEAT. *These were "Gas Competition" in the June 1944 issue, and "Organize to Fight Gas" in the August 1944 issue. The story that follows is concerned primarily with manufactured gas.*

GENERALLY SPEAKING, the lid is off on new gas heating installations in the manufactured gas areas. This does not mean that there will be large numbers of installations in the near future since equipment stocks are too limited. It simply means that about four-fifths of the gas utilities have now been given permission to add house heating customers to take up any slack in their demand caused by relaxing of war production.

This liberalizing was started last summer when a handful of companies complained that they had surplus gas seeking a new home and were given administrative exceptions to the gas limitation order, which forbade home heating installations. Month by month since then more companies have been given the exceptions until today some 360 companies have them. At the time of the New York OHI meeting in November about 175 had been opened up.

At the start some check was being kept on the number of installations, but this is no longer being done. Two major Eastern cities took the brunt of gas competitive pressure in 1944; Philadelphia had about 1,200 installations and New York, including Westchester County, about 1,000

For two reasons, the probability of large numbers of gas heating jobs being installed in 1945 is remote. First, the easing of war industry demands that made surplus gas available is no longer in the picture. Since the reverses of our armies in Europe in December the timetable for ending that war has been stretched out and huge orders are being placed for additional war products, with the result that war industries will again be booming and using more gas. In fact, some of the gas utilities who now have permission to sell home heating jobs don't want any and are finding it difficult, if not impossible, to properly serve the domestic and industrial customers they have.

The second retarding factor is equipment scarcity. Last spring the Office of Civilian Requirements made a survey on this and determined that factory and dealer stocks of gasburners and units throughout the country were about 21,000. Since then, manufacturers have been given permission to make an additional 6,000 conversion burners under the Spot Authorization Plan, so a total of about 27,000 jobs is the outside limit of the program up to now.

About three-fourths of those have been held in the natural gas areas of the Midwest and West, so relatively few have been available in the manufactured gas regions, aside from Philadelphia and New York.

However, the actual number of installations is not the full measure of the new gas competitive threat. In some localities gas companies have been selling "priorities" to be able to get gas put in when equipment shall become available. In other words, they sign up the prospect for an installation that may not be completed for a year or two.

This gas liberalizing program was initiated, of course, by the Office of War Utilities. But before they could put it across with the top War Production Board, they had to get the unanimous approval of three other Government agencies, the Petroleum Administration for War, the Solid Fuels Administration, and the Office of Civilian Requirements. In each of those, the top man to make the final decision was either an oil man or a coal man, so you can be fairly sure that the utilities crowd had a convincing story or they couldn't have sold those other agencies.

Valid Reasons

Their story was that where natural gas was available in surplus quantity, using it would save hand fired sizes of coal and distillate oil, both scarce. In the manufactured gas sections they make the gas primarily with residual oil and steam sizes of coal, both much more plentiful than the distillate oil and hand fired coal that they would replace. They also pointed out that they would not overdo the thing, but limit it to present equipment stocks. So they got the green light from the other three agencies, and I don't think that there is a chance for us, individually or collectively, to upset this present deal.

That doesn't mean, however, that we should not keep alert to developments. The scarcity of equipment stocks is being so keenly felt that there is now under consideration a program to build a small additional number of gas conversion burners —no complete units. The project calls for 4,500 a quarter and, while it has not been approved, there is reason to believe that it will be within 60 days. This small quantity of burners is said to be needed for essential replacements and for hardship

relief cases in the areas where gas is the prevailing fuel, such as the Southwest and the Pacific Coast.

Any disparaging comments about this program bring the answer that oilburners have a program in effect for 30,000 burners a quarter and stokers for 37,000.

Naturally, the complaint of oilheating men who take time to think through on the subject is not so much in the number of gas installations but rather an expression of the feeling that it is unfair to let a competitive fuel make headway while our industry's product is away from home winning a war. More later on that point.

It may look like we're dismissing the present difficulty too lightly. It doesn't mean, though, that we don't consider gas a serious threat to our future; quite the contrary. The American Gas Association is going to spend four million dollars in the next three years on promotion, and gas promotion campaigns are often quite successful. On the other hand, we must keep in mind that they are doing it because they consider our competition to be serious. We often overlook what they are up against in competing with us—I would hate to trade places with them. Let's look at a few figures, and perhaps you will agree with me that they have had to work twice as hard as our industry to get where they are.

First, let's think about fuel costs. Manufactured gas throughout the East is generally a 540 Btu gas. It sells for an average of 64.2¢. So 540,000 Btu's of gas costs 64¢. Oil with 140,000 Btu's sell normally for 7¢. So with oil for 64¢ we get 1,300,000 Btu's or 2½ times as many as gas.

If we think that's tough competition, how would you like to have the picture reversed? You may say that gas users don't pay 2½ times the cost of oil to heat their homes. That is right, they don't, and that is where the brains and hard work of the gas industry show up. We have always been so favored with a cheap automatic fuel that we haven't had to learn to plan and drive like they have.

The average gas heated home uses 275,000 cu. ft. @ 64.2¢ or $177.* The average oil heated home uses 2,000 gallons @ 7¢ or $140.

*This average is based on all manufactured gas companies reporting to AGA. Actually, more gas jobs are Southern, more oil jobs Northern, so costs are not exactly comparable, but the implications are still essentially sound.

So the annual heating gas bill is 25% more than oil, where the Btu cost of the fuel before it was burned was 150% more. Why is this?

In the first place, the gas people have done a fuel conservation job for a good many years that makes us look like babes in arms. As a rule, they won't put gas in new homes unless they are insulated and have weather strips and storm sash. In old homes they insist on these and if necessary will add them to the transaction and carry them in the monthly payments. If you fully insulate, weather strip and storm sash a house that did not have them before, fuel requirements are cut a good 40%.

Gas Fuel Conservation

What else do they do? Long before we ever heard of Joel Dean, they were telling people that the most healthful temperature is 65°. In some cities they rig up a timeclock for a complete shutdown six hours each night. They won't put a conversion burner in an old style coal boiler. If you have that kind, they sell you a complete unit, or it's no gas. In the last year before the war, 1941, 73% of all gas installations were complete units, against our 26%.

Then we have the engineering side of it. The normal good gas unit operates at 80% efficiency; they have to have that to carry the AGA label. By efficiency I mean an actual measurement of the number of Btu's that come out the top of the boiler into the lines, as compared to the number of Btu's that went into the burner. The average good oilfired boiler-burner unit will have less efficiency.

The gas units run at stack temperatures of 275°; oil units 500° to 550°. The gas unit loses 2% to 3% unburned gases up the stack; the oil unit 8% to 10%. Is it possible to build oil units as efficient as gas units? Yes, it is. I have seen the tests on one that got 78% efficiency, but it is not too widely sold. In general, we haven't done it because we never had to—we didn't have a fuel cost handicap of 150% to overcome.

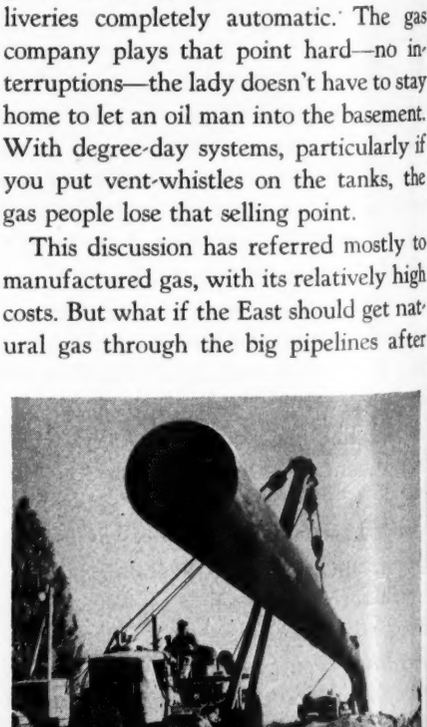
What can we do about all of this? Obviously, there are only two choices. We can go on as we have been for some years and let them take two jobs to our five—they earn them the hard way. But if we choose that course, we can't feel that there's anything unfair about it. The other choice is to take a leaf from their book.

If we decide to learn from the gas companies, it's going to take a little time to get results. But there is one thing we might do now at very little cost that would help to build a backfire against that four million dollar gas promotion campaign. We could put more emphasis on the fact that oilheating costs less—that is our strong competitive argument. Of course your salesmen always point that out when talking to a prospect. But that isn't enough—it should be done in a promotional way. Just before the war out in St. Louis and Minneapolis the Shell Company had a lot of billboards, with one very simple statement on them, "For Fully Automatic Heating, Oil Costs Less." Those boards helped turn the tide. The oil to gas ratio improved considerably in 1940 and 1941.

Why can't you now, in your local associations, adopt some such phrase and work it to death? You could carry it in any of your promotional mailings, any local advertising, and cheapest of all, you could carry it on posters on every fueloil truck. It wouldn't be long before the idea started to sink in, and the gas companies would have a little more resistance.

Another simple point—a lot of companies could do more to make their deliveries completely automatic. The gas company plays that point hard—no interruptions—the lady doesn't have to stay home to let an oil man into the basement. With degree-day systems, particularly if you put vent-whistles on the tanks, the gas people lose that selling point.

This discussion has referred mostly to manufactured gas, with its relatively high costs. But what if the East should get natural gas through the big pipelines after



the war? Keeping fairly close to the thinking on this in Washington, the chances today are 10 to 1 against it.

There are only two groups who think they should go to gas, and curiously neither group is the gas industry. If the Eastern gas companies want natural gas in those lines, it's the world's best kept secret. In the Department of the Interior some men think they should go to gas, because they think it's criminal to let 2 billion feet a day go to waste down in the Southwest. The other group that thinks they should go to gas is a number of Midwest oil refiners who are afraid of cheap Texas gasoline running through those lines after the war; some of it might spill out in Illinois, Indiana, or Ohio, and be tough competition.

Stronger Arguments Against

But the groups that feel sure they won't go to gas seem to have most of the valid arguments. First, the gas being wasted in Texas is not concentrated; it's in scattered small oil pools—a dozen wells in this county, 15 in the next county, and so on. They point out that the real concentrations of gas are now on lines, and that the cost of gathering from these small pools would be excessive. Again, the Texas Railroad Commission wants to keep those small pockets of gas to attract industries that need cheap fuel for processing. If they locate right in one of these small pools, fuel cost is virtually nothing.

The pipeline operating costs just released show that no tanker can compete with them and make a profit. Actual pumping costs are 8¢ a barrel for crude and 10½¢ for refined products. There is not going to be a serious surplus of tankers, anyway. Counting those that will be built to the end of 1945, and assuming present rate of sinkings, which are low, Government estimates show that the world's total tanker carrying capacity, counting both size and speed, will be only 40% higher than before the war.

What will these extra tankers be used for? There is a big world rehabilitation job to do, and oil must do a lot of it in one way or another. The Armed Forces crowd in Washington want us to use a lot of them to start importing oil after the war. It isn't that they think we won't produce enough here for our needs next year or a hundred years from now, but that they know that the extra oil to win this war was our cushion, and they want to put back the cushion. Only half of the oil used in the war came out of our former civilian supply; the other half came from pumping a cushion that we scarcely knew we had. So for a few years after the war they want us to import about 900,000 barrels a day, and produce that much less here. There's some talk of bringing it in to the East Coast and reversing one of the big pipelines to serve Middle West refineries, instead of supplying them from the Southwest.

So it all adds up to very little chance for natural gas competition from those lines.

It is interesting to learn sometimes that your competitor is quite a lot more concerned about you than you are about him. It's like an Army captain taking a bunch of green troops into battle for the first time. He hunts up the boys that look a little pale, tells them that it's all right to feel that way—he's scared, too—but the enemy is just twice as scared.

The gas crowd is looking at postwar oilheating competition, and they don't feel too serene about it. They know that for the moment we're a war casualty, but they also know that if a casualty is completely cured of his wounds, and comes back home full of medals, he's tough competition. Why was oil the one fuel selected to handle the biggest job our country has ever had to tackle. Was it because some of the oil men went down to Washington and sold a bill of goods. No, it was because oil is the most compact, uniform, powerful, safe and easily handleable fuel that anyone has ever found. Do you know that your basement oil tank filled with heating oil contains more actual energy, in Btu's or foot-pounds or however you want to measure it, than if that tank were filled with nitro-glycerine; and it's safer too, if there are children.

War Oilheating Experience

Has it ever occurred to you that the 11 or 12 million boys coming back from this war are going to dominate the thinking of this country, socially, economically, politically and psychologically for the next good many years, perhaps for the rest of our lives? If we think we're going to run the country, we'd better make the most of the next year or two. Now what about those boys? Maybe a few are illiterates, but most of them are intelligent and they know that outside of blood and guts petroleum is winning this war. At the most exciting and impressionable period of their lives, they are seeing and learning to appreciate the effectiveness of petroleum in all of its forms every hour of the day. If that sounds a bit on the lyric side, let's look at a couple of examples.

In the winter after Pearl Harbor we had a fleet in the South Pacific, but what a fleet. We had two cruisers, the Houston and the Marblehead, and a half dozen destroyers, and the boys were spoiling for a fight. They got word that a large Japanese convoy, heavily escorted, was heading South toward the Macassar Straits,

and told to go and intercept it. As they steamed North through the Celebes Islands, a little Australian destroyer swung out of a passage and semaphored to the flagship, the Marblehead, "We know where you're going; we want to go along, but we haven't enough oil." The Marblehead signalled it alongside, shot a bos'n's line, a hose, and pumped 500 barrels into the little tub while they were tearing up the Strait 33 knots. How would you like to try that with coal or gas? Can't you imagine the boys down in the hold of the ship, tense, eager for the shout on the loud speaker system, "Battle Stations," and then to have the skipper instead call into his microphone, "On deck—with shovels." Or how about gas? Long before they could pump enough gas to equal the 500 barrels of oil, the little destroyer would have left the water and taken off over the islands.

Out from Alaska we have the long string of Aleutian Islands, with nearly every one of them occupied by some kind of Navy installation, perhaps a weather station, a radar station, an airfield, or what have you. Most of them are rocky and have no docking places for boats. So a Navy supply ship steams slowly past

(*Continued on page 80*)

Save the Pieces

Shortage of Repair Parts Threatens Oilburner Service

by
A. E. Coburn

ALL DAY LAST September 14, a gale of hurricane force was tearing its way up the Atlantic Coast. Torrents of rain swelled streams out of their banks, and winds pushed tide waters into the streets of coastal cities. Obscure in the millions of dollars worth of damage were an estimated 20,000 oilburners between Norfolk, Va., and Portland, Me., that were under water, and the heating season was about to start. Serious as the damage to the oilheating equipment was, nobody at that time knew that future shortages of burners and parts would make this additional service load almost catastrophic.

Lack of motors, transformers and controls in these days can be traced in part to the tremendous drain the eastern hurricane imposed on existing stocks. At that time, however, it was considered probable that parts would be manufactured in greater and greater numbers during this heating season as domestic production started to swing back to civilian goods, but that was before the break-through into the Belgian bulge.

Motor racks *at Sid Harvey's normally are filled with a variety of sizes and types most used. Today a third of these shelves are empty and no replacements are in sight.*

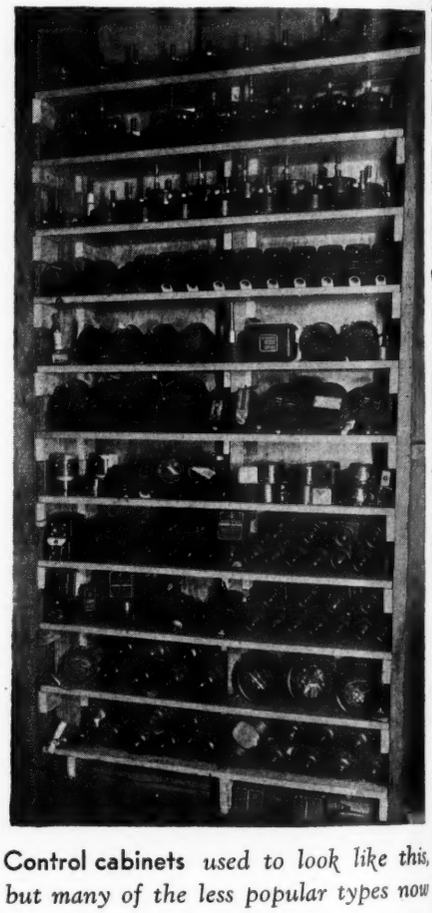
Some measure of the present critical supply situation on oilburner parts can be seen in the records of Sid Harvey, Inc., Valley Stream, N. Y., one of the larger oilburner supply houses. This company, established in 1931 as an oilburner distributorship, has evolved into a major source of repair parts for eastern dealers and is expanding its service into other parts of the country. The line includes relatively few of the items in a conventional heating supply house, but insofar as it is possible to get materials, it includes everything an oilburner service man ever demands. These demands, of course, frequently include specific oilburner parts, and the company normally stocked new parts and did a small repair business to recondition dealers' motors, pumps and controls.

Exchanges Speed Service

It was not always convenient to do a rush repair job for a dealer customer, so Harvey inaugurated an exchange service. Under this plan a dealer could bring in a defective pump unit, for instance, and for a flat price, could get an identical new or rebuilt unit in exchange. The company could recondition the old unit at its convenience and put it in the rebuilt stock. This exchange plan became popular with dealers. It provided quick service at a low cost, not only for those who worked near enough to bring their work to the plant, and Metropolitan New York dealers for whom a pick-up and delivery service was maintained, but also for those who sent in their defective parts by mail and express. Mail exchanges are made the day they are received.

The repair business which started as a convenience, now has grown to represent a third of the company's business in 1944, and is still growing. With new parts practically off the market, dealers are learning to salvage defective equipment and have it repaired. Contributing to the trend is the service manpower shortage. Servicemen these days are rushing in and out of basements as fast as possible. There is no time to lose, for there are nine calls ahead. Field repairs on the basement floor are too costly in time, so units have to be replaced when defective and repaired when convenient. Usually they are sent to specialists like Sid Harvey for a thorough overhaul.

The impossibility of getting all the new parts necessary for replacement, plus the time factor which has become so important, has shown in sales statistics.



Control cabinets *used to look like this, but many of the less popular types now are missing.*

Considering mail orders alone—a measure of the urgency outside the immediate neighborhood—Harvey handled 12,686 such orders last year against 6,745 mail orders in 1943, an increase of 88% for the year. Among these orders were 1,001 new customers; dealers who never before had done business with the company. This is almost double the new customers that came to the firm in 1943. Of all the dealer-customers, 13.25% of them bought on an average of once a month or more in 1944,

compared with 8.5% who filed twelve or more orders in 1943. Supply is getting tougher. Old parts must be renovated and made to last out the war, or the domestic oilburners will have to be converted.

The hurricane service load was evident in the sales records, too. Mail orders in August totalled 930. The hurricane struck before the middle of September and orders in that month jumped to 1,516, and went on to 1,768 in October. Mountains of drowned motors, controls, transformers, pumps, solenoid valves and other burner parts poured into this repair depot. Others were equally busy, and the volume has been maintained to the end of the year. Harvey's December mail orders were 1,755, almost equal to the October peak, and piles of worn and damaged equipment were arriving every day during January. The normal service load curve shows a slackening of demand before the end of December, but this is not a normal season. Dealers cannot allow service men to spend their time making field repairs, and many of the men are not sufficiently skilled to do them these days. If the motor does not start every time the circuit is closed, the men cannot spend their time experimenting with the starting switch. The motor is replaced in half the time and sent out for repairs. If the pump cannot maintain pressure, it is replaced. If the valve does not cut off, the unit is replaced. Basement floor repairs have had to give way for the sake of speed, and many dealers report they like the idea better every day. Expert rebuilding by trained men provides a unit that is less likely to cause future trouble than one that has received make-shift repairs under pressure of time in an emergency.

Service Can't Wait

The idea of exchanging damaged or worn parts for ready rebuilt parts of identical specification was born of the necessity for quick repairs and fast service. Manufacturers usually can wait for materials, but dealers on service have to get the burner going before the house freezes. There is no time to wait for a motor to be rewound or a pump unit overhauled. For a flat price an exchange can be made on the spot, but even this service was speeded up. By leaving a deposit of 100% more than the exchange price, a dealer could get an advance exchange, and have his deposit refunded when the defective part was finally turned in. If the price of a motor exchange, for instance, were $8, by leaving $16 the dealer could take the rebuilt motor to the job with him, and get his $8 deposit refunded when he returned the old motor.

Pump units, *valves and relays of almost every known specification have to be stocked. Units and parts have started to disappear from the shelves.*

All this had to be changed. Motors and transformers became almost impossible to get, either new or rebuilt. Too many dealers were willing to buy the old motor by forfeiting the deposit, have it repaired at their own expense and be ahead one motor. Price became no object when the equipment began to disappear. Sid Harvey's motor stocks have shrunk a third as a result of this willingness on the part of dealers to buy their old equipment for the amount of the deposit. Advance exchanges had to be stopped to protect the rotating stock of motors. Today no dealer can take a motor away at any price before he brings in the damaged one. Harvey cannot buy new motors, either.

Manpower is a problem among manufacturers and dealers no more than it is to repair depots. Manufacturers build their particular products by production methods. The repair shop must tear down and rebuild the products of a number of manufacturers, and any attempt to adopt straight-line methods is extremely difficult. Harvey stocks Webster fuel units of 21 different specifications, single and two stage, clockwise and counter-clockwise, outlet on the right or left, and all the combinations. They also have to carry fourteen different Sundstrand units, as well as Tuthills, Vikings, Electrols, Delcos and Mays, belt driven as well as direct motor drive. Many old parts are not available from either the manufacturer or supply houses, and then the company tries to adapt available equipment to the older mountings.

Variations Complicate Replacements

Motors are no less a problem. Oilburner manufacturers have gone largely to flange mounted motors in recent years, but there was no standard mount that was adopted by any large number of manufacturers. Some liked two-stud mountings with the centers in a horizontal plane; others like them vertical or at a 45° angle. Still other manufacturers thought motors should be mounted with three or four studs, some liked long shafts, some short, and shaft diameters were a matter of choice. Some have pump units attached, and some have fans. Regardless of specifications, dealers expect and must have replacement parts. There are no new burners to take the place of the 140,000 which now are working on borrowed time.

Manufacturers also liked individuality in their transformers. Some wanted the terminals on the end, others on the bottom, and mountings varied with the whim of the designer. This gave the burner a distinctive appearance, and sometimes the design made for easy servicing. When parts were available nobody thought seri-

ously of these variations in design, but now that the old parts must be rebuilt and stocked for all possible emergencies, these whims of design complicate the parts supply picture. No supply or repair house is asking for standardization, but they are concerned about their ability to supply every specific part that may be needed.

To dig out every possible piece of old equipment, Sid Harvey has recently covered its customers by mail with a special offer. Listed are nine specific pump units and ten controls for which the company is offering $4 in cash or credit, regardless of the cause of the defect. All they want is all the parts, subject to ordinary wear. The announcement also urges dealers to send in parts not specified for credit. Any used piece of equipment that is subject to rebuilding is wanted, and dealers are being asked to cash their scrap piles.

The term "rebuilt" is one that has a sour flavor to many. It has too often been used in place of "second hand" until its true meaning has been colored. A real rebuilding job turns out a unit capable of new unit service, though it is not a truly new piece of equipment. The servicability of a rebuilt part depends on how conscientiously it is overhauled, but conscience these days sometimes is tempered by manpower considerations. Because experts in all phases of service are not available, reorganization of routines has been necessary to insure proper reconditioning of parts.

Repair Routine

Follow a defective fuel unit as it is received at Sid Harvey's. There is not time or enough skilled manpower to put the unit on test to find exactly what is wrong with it. "Further," says Vice President Lawrence Harvey, "a test might show you what is presently wrong with the unit, without revealing which worn part is likely to go a month after the unit is put back in service. So the first step is to tear the unit apart, and this doesn't take a lot of highly specialized knowledge. The component parts are all cleaned and put into a dime-store bread pan, which is passed through a wicket to the next stage on the line. Here a trained man removes all parts that are subject to wear, and whether they are in need of replacing or not, new parts are substituted. The unit then is re-assembled and put on test, while the removed parts continue to more skilled hands for examination with special tools, and reconditioning as needed. When the unit has passed all its performance tests, it is refinished, tagged and put back on the shelf for stock. In this way we are able to use well trained men and women, but no one of them has to be an expert on all phases of fuelunit service."

This same system is followed in general in the handling of all other parts that have to be reconditioned. Most of the company's 96 employees are well trained to do a specific job, but few are sufficiently skilled to do all the operations necessary on pump units, controls, motors, valves, transformers, and a variety of other products that flow into the shop for repairs.

Harvey's is only one of several repair shops that are flooded under a tide of work in these difficult days. Started as a convenience and an economy for oilburner dealers, repair depots probably will carry a major part of the burden of keeping domestic burners operating during the next few months. Manufacturers capable of producing precision parts are under such heavy Army and Navy schedules that they will not be able to produce civilian goods for a long time yet, and there would be no chance for them to carry the repair load which otherwise would be imposed on them.

Dealers have a big responsibility to keep their customers warm. On them rests a major part of the good will the whole industry has built over the years, and they are facing this responsibility with fewer men, with less experienced men, and without the new material which they so desperately need. The only solution to the parts shortage is to rebuild every salvagable part that can be rebuilt and put back into service.

New War Production Demands Kill Hope for Many Burners

OILBURNER MANUFACTURERS on the Advisory and Post War Planning Committee of Oil Heat Institute of America put the industry on notice January 9, that few domestic burners could be made for replacement in the near future, in spite of the critical need for additional burners. Greater war production has been demanded of many of the manufacturers, and others have had delivery schedules stepped up so that civilian production is totally impossible.

In a resolution to the Board of Directors the committee made three points: (1) that manufacturers are being urged to greater and faster war production to the exclusion of all civilian oilburner output, and that dealers should be notified that manufacturers are powerless to return to oilburner production so long as the present urgency exists; (2) that present ratings assigned for repair parts are too low to obtain material for repair in the quantity it is needed, and that an attempt be made to get higher priority ratings in order to avoid extreme hardship, and (3) that dealers be notified that they will be called upon to carry a greater service load during the rest of the heating season without direct help from manufacturers, due to the manufacturers' inability to produce replacement burners or sufficient replacement parts.

At the directors' meeting C. Muirhead of the Office of Civilian Requirements said that it was his personal estimate that not more than 10,000 domestic oilburners would be built in the last quarter of 1944, including the 30-day grace period allowed for the completion of quarterly production. He said a shortage of component parts was holding up production of the smaller manufacturers, and that the larger manufacturers were having trouble getting sufficient manpower to produce civilian goods.

Sixty-nine manufacturers had received authorization to build 20,000 domestic oilburners by the middle of January. Three of the largest corporations in the business had not been given authorization, since their situation was obviously so bound to the war effort that they were beyond consideration. Six companies have received authorization to build more than half the total, but a survey of those firms has revealed that they will make not more than 10% of their part of the quota, or about 1,100 burners. The manufacturer with the largest single allotment reports that

he might ship as much as 25% of the burners authorized, but hastens to explain that many of these will not be complete. Dealers now are ordering burners less motors, pumps or transformers which they are able to supply and install. Smaller manufacturers have more capacity to build burners, since they are not so hampered by manpower restrictions, but they are not able to get required component parts to make all of their allotments. Manufacturers of motors, pumps, transformers, valves and other needed parts are located in areas of manpower shortage, and because of their ability to produce precision parts, they are heavily into war work. These are the plants that can produce the precise equipment required by the Army and the Navy. Foundry capacity in all parts of the country appears to be extremely tight. Labor is not anxious to work in foundries at present wage levels, and the demands for castings for the armed services continue high enough to take up available capacity.

Specific conditions vary widely across the country, but regardless of the details, the conclusions agree—there can be few civilian oilburners made at this time.

A manufacturer in Central Illinois reports that an all-out demand has been made for stepped-up war production. Some contracts already terminated have been reopened, and war orders on the whole have increased from 50% to 100% in recent months.

"We could produce no burners without hiring additional labor," this manufacturer reports, "and orders from the War Department are to produce a maximum of war goods. Though we are in a Class B labor area, the local supply is at present adequate to man the machines in the plant. All these machines, however, are busy on war work, and there is more work waiting to get on them.

"The AA-3 priority probably would get the necessary raw materials, with the exception of castings, and this alone would prove a bottleneck. All these conditions existed here prior to the present emergency. It is impossible to tell at the moment just what effect these new conditions will have on the above."

An Iowa manufacturer reports his local situation in this way:

"Manpower is not available in our area to manufacture a further quantity of oil burners, other than received by us on our original allotment from the War Production Board. Our factory is located in a #1 critical area from a manpower standpoint.

"The delivery promise we so far have received from our suppliers covering material needed for our present schedule, would indicate that unless they would be in a position to step up and increase their own production in some way they would not be able to supply us with sufficient material to take care of a larger or increased allotment of burners. We are experiencing serious difficulty concerning motors, transformers and castings.

"The war contract we have with the Ordnance Department just recently has been increased to practically double our previous schedule. In the mail this morning we received notice from the War Department that our product being manufactured for them was originally classified as 'Emergency—Urgent,' it now has been classified as 'Critical.' Therefore, it is going to be absolutely necessary that our production schedule on this item be fully maintained."

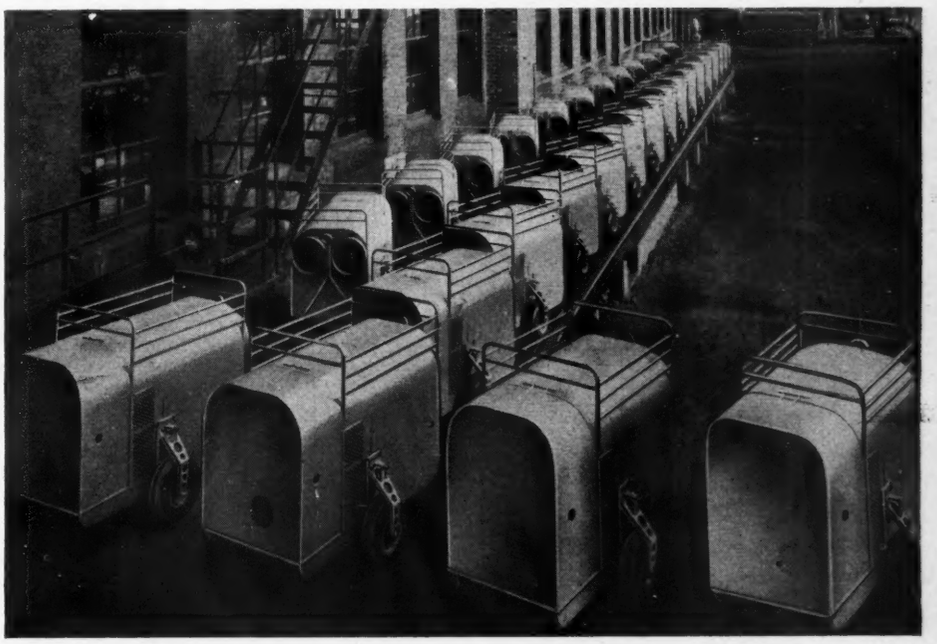
In Baltimore, a notoriously tight labor area, a manufacturer reports that any new help in the plant is subject to allocation by the local labor priority board, and the only present excuse for hiring men is when a contractor is behind schedule on critical war items. All men now employed in the plant are busy on war work, and could not be shifted to civilian products.

"Further," this manufacturer says, "it would be utterly impossible for us at this time to secure such parts as motors, transformers and castings with the AA-3 priority assigned.

"We have taken on in the last two months two new contracts on a project for both the Army and the Navy which is at the top of the priority list. This schedule could not be slowed for any oilburner production, as much as we would like to supply our dealers."

New England is no better supplied with labor. A manufacturer in the central section reports:

"We are in a Group 2 labor area and because there are two plants short of labor, all work not directly connected with the war effort is scrutinized by a Production Urgency Committee. Our small allocation of oil burners was approved only by giving the Ordnance District assurances that such work would not interfere with our war work. If we had all the materials, we could produce a small quantity of burners with our present manload because there are times between contracts when some men are available for machining and assembly.



Thirty-one aircraft engine warmers *waiting on the platform at Harvey-Whipple's for delivery to the Navy represent 9,000,000 Btu of oilheating capacity that is lost to civilians. What the services need, they must have.*

(Continued on page 75)

Bench Tests for Nozzles and Pumps

Speedy Check-Ups Add to Dealers' Service Profits

by
J. W. Schulz

"WE SHOP-TEST burner parts to increase our service profits," declares the owner of a company that services 1,800 oil burners. "Many assemblies seem defective on trouble jobs, but prove perfect under rigorous bench tests."

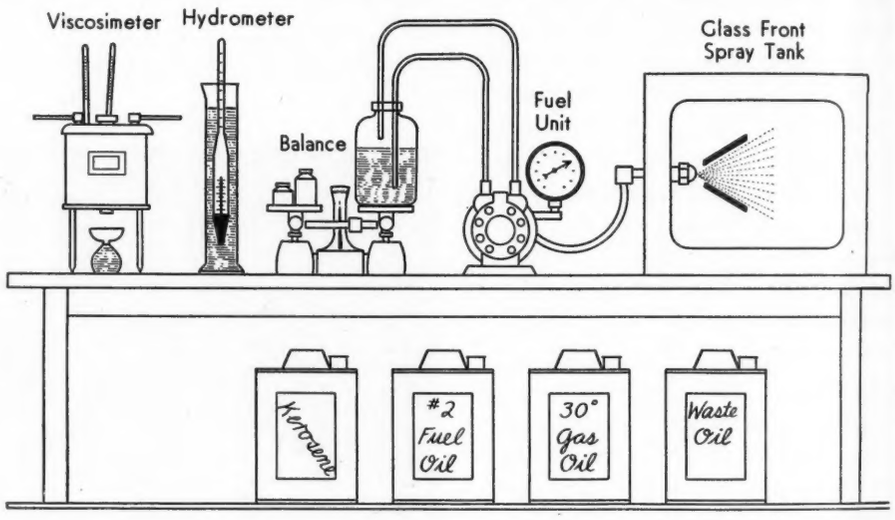
Another dealer learned that "unusual burners can be serviced speedily and at lower cost with the help of shop testing." Recently an odd commercial burner gave trouble with a special oil valve. Half an hour of valve fixing, punctuated by pressure tests to ascertain whether the valve closed dead-tight, permitted this dealer to restore heat the same night the burner broke down, "although every other service man in town said heat was impossible until new parts were obtained from the burner manufacturer."

One service man explains that without his test bench check-ups he wouldn't know which make nozzle was best; his own tests indicate that some nozzles are rated loosely and that he can't verify gph ratings and spray angles on actual installations.

A dealer who recently became test-minded collected 300 discarded, used nozzles that were scattered about his service headquarters. Most were less than two years old, having been removed from burners because other nozzles, of different spray angles or gph ratings, gave better combustion. First the nozzles were cleaned to look like new. Then they were tested speedily but thoroughly. The dealer reaped a harvest of 138 nozzles he knows perform perfectly.

Any dealer who starts making his own performance check-ups on oil-handling parts gains an insight into fueloil characteristics and quality, for he must make the tests with oil that has been checked as fit for the valves, pumps, and nozzles. Gaining knowledge of fueloil fits in with today's trends, because the shift to heavier domestic oil is bringing new service problems and new combustion efficiency snags.

The bench layout for testing atomizing nozzles, shown in the drawing, includes a viscosimeter because the viscosity of the oil used for testing must be known to gauge the performance of a nozzle; lower or higher viscosity affects the degree of atomization, the gallon-per-hour delivery of a given nozzle, and the spray angle. Only when he knows he is testing with oil of the proper viscosity, does a burner expert complain to a nozzle manufacturer that the nozzles he receives give fires much smaller or larger, or spray angles considerably narrower or wider, than nozzles are marked.



For quite a few years up to recently, viscosity of about 35 seconds (Saybolt Universal at 100°F.) could be expected of the fueloils delivered when No. 2 or No. 3 oil was ordered, although 45 seconds is the maximum permissible viscosity for No. 3 oil and gives excellent performance in typical pressure burners. Recent field check-ups of high grade nozzles now in the hands of dealers and service men show that they usually match 35 second viscosity oil. Tested on such oil, the nozzles show their rated outputs and spray angles more or less closely when 100 lbs. pressure is used. With much lighter oil (perhaps kerosene) or much heavier oil (viscosity 55 seconds) the nozzles perform much differently; though the resultant atomization and combustion usually is acceptable, the gph rates and spray angles do not jibe as well with the ratings as they do when 35 second oil is fired.

For a fact, many well-informed burner engineers declare that no harm comes of firing 55 second viscosity oil through a nozzle whose gph and spray angle markings are in terms of 35 second oil, as long as the man tuning the burner realizes that the heavier oil gives a HIGHER firing rate than would be obtained at the same pressure with lighter oil. During the tuning of the burner, it may or may not be realized that use of the heavier oil gives a narrower spray angle than would come with the use of the lighter oil, to which the nozzle markings apply. If he makes allowances for these characteristics of nozzles, and perhaps at the same time uses higher atomizing pressure, usually a service man finds it possible to burn 55 second viscosity oil using a nozzle whose markings are in terms of the old, well-known No. 2 or No. 3 oil of about 35 seconds viscosity. For an idea of the numbers behind the problem of obtaining the proper firing rate under these conditions: During one test, a certain nozzle fired 1.9 gph when 35 second oil was used; at the same atomizing pressure, this nozzle gave 2.6 gph when 55 second oil went through it. All this does not apply as well to efforts at burning the rarely-encountered heaviest oils suitable for large pressure burners—oils of viscosity up to about 70 seconds. To obtain high combustion effi-

ciencies using such oils in commercial size typical pressure burners calls for special service and tune-up work, which includes obtaining special nozzles to match the high viscosities of the oils.

Trend Toward Heavier Oils

Disregarding the unusual problems with fueloils, the dealer or service man who makes bench tests of nozzles should be aware that the trend is towards somewhat higher viscosities for the fueloils that are being delivered for use on pressure burners. Accordingly, to produce data valuable to service efforts, a dealer should have on hand three kinds of oil: kerosene or No. 1 fueloil; No. 2 fueloil of about 35 seconds viscosity as was used generally in the past for pressure burners; and fueloil of higher viscosity, say between 45 and 55 seconds. The last-mentioned oil, the heaviest likely to be delivered in the near future as fit for domestic pressure burners, may as yet not be obtained easily by some dealers interested in testing nozzles with it. A blend of No. 2 oil and what is sometimes called "No. 4," in proportions to produce the desired viscosity, will serve for the nozzle testing. Or, because the physical and mechanical aspects of atomization are of interest, and not the composition of the oil from a chemical standpoint or from the standpoint of distillation tests, a dealer can improvise for his initial tests using a 45 second viscosity oil (or 55 second oil if he pleases) compounded by adding light automobile lubricating oil to No. 2 oil in the amounts that will result in the viscosity he desires.

The drawing of a nozzle test bench shows a hydrometer next to the viscosimeter, not because specific gravity is of direct importance to atomizing problems, but because a hydrometer reading is easy to take and often serves to tell which of two or three previously identified oils has come from a trouble job. If, for example, the oil is dirty and black but shows the specific gravity of kerosene, the service man may lean towards the idea that kerosene was last delivered to the installation and made dark by heavy oil left in the owner's tank from previous loads. Any service man can read the specific gravity of a fueloil, in less time than it takes to tell how, but to get a good reading from the standard viscosimeter calls for time, laboratory technique, and considerable experience. Because of this, a prominent manufacturer of nozzles and burner specialties brought out a special viscosimeter; notably inexpensive and easy to operate, this gives invaluable assistance to service men interested in getting the real facts behind fueloils and nozzles.

Use of the balance or scale shown in the drawing permits easy check-up, by stop-watch or ordinary watch, of the gph rate of a nozzle. Of course, 100 lbs. pressure is used for this check-up. The nozzle to be tested is installed in the glass front spray tank. Fueloil is poured into a clean jar, of about two quart capacity, which is placed on the balance. The fuel unit is started and oil is sprayed from the nozzle for a few minutes to rid the fuel unit and oil lines of air and fill them with the oil used for the test. Then the pump is stopped and the scale is brought to balance, using (in addition to other weights) one weight that weighs one-half a pound. Now this particular half-pound weight is removed, putting the scale in condition to balance itself when exactly one-half pound of oil has gone from the two quart jar. The pump is started, and the time is measured from the second the nozzle sprays oil until the second the scale goes to balance. The watch tells the number of seconds the nozzle takes to emit half a pound of oil, and with the help of petroleum characteristic tables the gph rate of the nozzle can be computed. A table can be made easily to tell gph rates in terms of the time it takes to burn one-half a pound of the oil used.

Any similar simple procedure can be used to begin with by a dealer checking the gph rates of nozzles. Refinements can be added later, if the dealer desires. Actual check-ups on nozzles will show, however, that there is no point in aiming for n'th degree accuracy. If you never have checked nozzles before, don't come to conclusions about a certain make nozzle before you make comparative tests of several other makes.

Gauging Spray Angle

To gauge the angle of spray, take measurements or use marks made on the back of the spray tank (the drawing shows heavy marks for 60° angle). A circle of heavy wire may be used. Held at the point where it touches the oil spray all around, it will be closer to the nozzle if the spray angle is wide, farther from the nozzle if the spray angle is narrow. The distances from the nozzle can be interpreted in terms of spray angles.

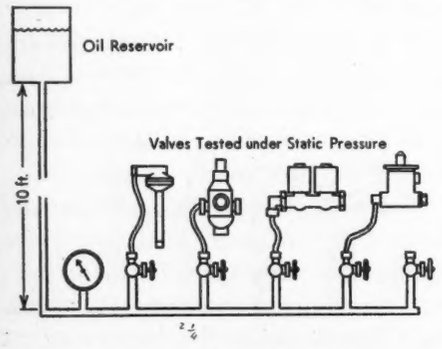
The nozzle tests should be made with the fueloil and the room temperature at some established and convenient level (70° or 75° will do) which should be repeated for all tests supposed to be comparable. On actual installations, the nozzle temperature runs higher than ordinary room temperatures, and this gives the big difference between actual performance and shop testing. On actual installations, nozzles give somewhat different gph outputs, spray angles, and degrees of atomization than they do in a test bench set-up. With the nozzle burning oil, and warming and thinning it, the gph output DECREASES (for the same oil, the same nozzle, and the same atomizing pressure). For example, a certain nozzle operating at 70° in a shop test gave an output of 2.4 gph; using the same oil and the same atomizing pressure, the nozzle output became 2.2 gph on an actual installation where heat from the flame was judged to raise the nozzle temperature to about 120°. In some instances, heating of the nozzles by the flames decreases the gph rates as much as one-third below those obtained during bench tests at 70°. Here are other practical factors related to nozzle heating:

1. Higher nozzle temperature tends to improve atomization.
2. It tends to make for wider spray angles.
3. Its effect is greater with higher viscosity fueloils than with thinner oils, for the thinner oils have more nearly constant viscosity under the same degree of heating.
4. It is considerably different for different burner models, and for the same burner models on different installations, rendering it difficult to predict and to allow for in bench tests.
5. It makes for slightly higher gph rates when cold burners are first started—the gph rates may be said to drop to the "normal" for the installations after the nozzles have been heated to the temperatures at which they usually operate. Unfortunately this is in the wrong direction, for if a combustion expert had to choose, he would prefer that the firing rate be increased slightly as the firebox temperature and the over-fire draft increase (from a cold start) on a typical installation.

For the test bench set-up, a relatively small glass container is used for the fueloil

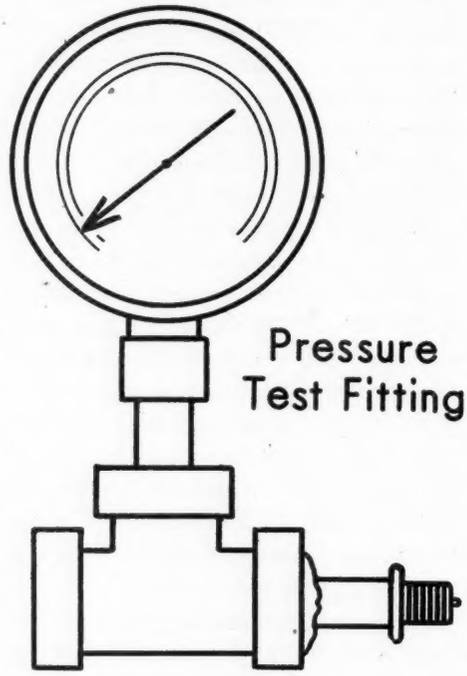
to make for ease and convenience in handling the oil and swinging to different test oil. The oil lines are 1/4" or 5/16" OD copper tubing. If the scale is moved from under the oil container, the container can be lowered without disturbing the oil lines. Any standard fuel unit, direct-coupled to a 1750 rpm motor, may be used. Naturally, the fuel unit includes an oil strainer and a combination pressure regulator and shut-off valve. The unit should be fitted with a pressure gauge for up to 200 or 250 lbs. pressure, known to be accurate. If necessary, the fuel unit should be altered to permit testing with pressures up to 200 lbs. The two-pipe oil system, suction line and return line, is used for easy starting after a switch in oils. Any switch calls for running the pump a few minutes with the "suction line" out of the oil container, to rid the system of as much as possible of the oil used previously, and for thorough flushing with a sample of the oil to be used next. Then the oil used for flushing is discharged, and the test run is started on a fresh sample of the test oil.

The glass front spray tank is of sheet metal, with a hinged top and a glass front panel fitted to be fairly oil tight. Nozzles can be changed easily and speedily, with the help of only a box wrench or socket wrench, if the nozzle adaptor is fastened securely to the end of the tank by slipping it through a pipe nipple equipped with screws that can be tightened to hold the adaptor firmly. The pipe nipple can be welded to a square piece of 1/4" boiler plate, which in turn is bolted or otherwise



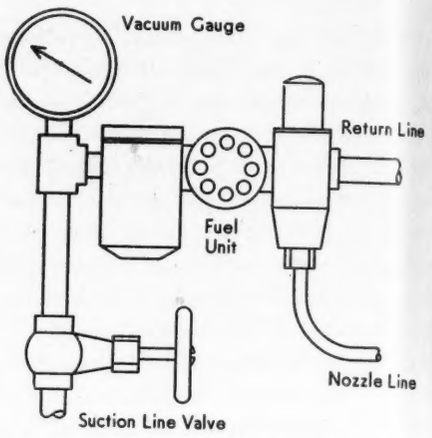
fastened to the tank itself. This arrangement, and the copper tube line to the nozzle adaptor, should be layed out to permit loosening the adaptor and turning the nozzle around while it sprays oil, so that the oil spray can be studied from all sides. This permits discovering if the spray is lopsided, or lighter or heavier at the sides than at the top and bottom. A copper tube line, soldered into the bottom of the spray tank to drain it, runs through the bench to the "Waste Oil" can under the bench. This layout permits removing the oil cans to a safe storage location when the test bench is not in use.

To permit testing shut-off valves, constant level valves, solenoid valves, and pump shaft seals, an oil reservoir may be located about 10 ft. (or as high as possible if the shop does not permit using 10 ft.) above the test bench, to give a static head pressure equal to the maximum found on typical installations. A manifold fitted with a suitable pressure gauge and four or five globe valves may be located at the test bench, as an accompanying drawing shows. To connect the devices to be



tested to the manifold, use 1/4" OD copper tubing. A shut-off valve to be tested, for example, is wiped bone-dry on the outside with a cloth, and placed in a clean, dry pan for 24 or 72 hours, under the static head pressure. When comes time for check-up, the pan should still be clean and dry. If the dealer desires, he can use a closed oil reservoir with a gauge glass to show the oil level. If the reservoir is too low to give the desired head pressure, a compressor or hand-operated tire pump can be used to place suitable air pressure on it. The tank should then be fitted with a suitable pressure relief valve to safeguard against excessive pressures being used by accident. Do not, however, test shut-off valves, constant level valves, or pump glands with static pressures many times higher than will be encountered on actual installations, for this causes certain devices in good condition to show signs of failure.

After entire burners, or assemblies of oil valves or strainers or filters, have been

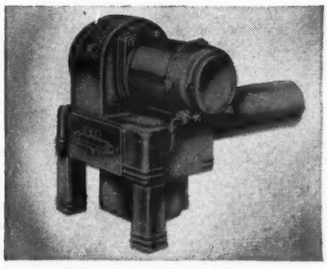


worked on in a dealer's shop, they should be tested for oil leaks. The pressure test fitting indicated in the drawing may be used. It simply consists of a tire valve soldered into a 1/8" or 1/4" brass pipe tee, and a pressure gauge. For speed in checking, fill the part with fueloil, plug tight all the pipe openings except the one to which the pressure test fitting is applied, and use a compressed air line or a tire pump to raise suitable pressure. Inspect the part after 24 hours, if time permits, to find out if the pressure has held up as it should. To find stubborn leaks in small parts, drain them of oil, fill them with air at perhaps 15 or 30 lbs. pressure, and submerge them in a pail of water. Bubbles will show the leaks. Brush a soap solution over assemblies too large to hold under water, and bubbles will lead you to the leaks.

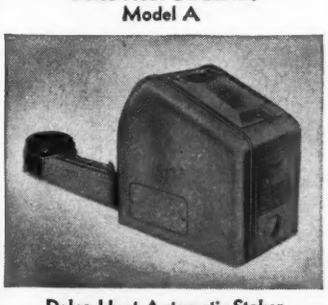
Fuel units suspected of being defective must be given several tests to check their various parts. Static pressure can be used to check the tightness of shut-off valves. Two check-ups should be made on the shaft seal, one a static pressure test to simulate the pump's being idle on a job with static pressure from an inside tank on the gland, and one with the fuel unit in operation, pumping against about 100 lbs. pressure. To check the strength of the pump in a fuel unit, set it up ready to operate with a suction line, a return line, and a line to an atomizing nozzle (the spray tank can be used). Install a globe valve in the suction line, and a vacuum gauge between this valve and the

(*Continued on page 67*)

Ahead NOW with DELCO-HEAT!



Delco-Heat Oil Burner, Model A



Delco-Heat Automatic Stoker, Model SD-30

Delco-Heat Oil-Fired Boiler, Model DH-4

IN OUR magazine advertisements during the past year we have been telling the amazing wartime story of the dependable performance of Delco Appliance precision equipment on active duty under the stress and strain of actual battle conditions.

The excellent performance of Delco Appliance war products *today* is actually selling Delco-Heat heating equipment performance for you *tomorrow*.

And *now* our current magazine advertising is telling your prospects to *save* for Delco-Heat equipment and place a *reservation order* at once for postwar delivery.

Today Delco-Heat is working on plans for a complete postwar line of quality automatic heating equipment.

As soon as Victory is won, these new postwar Delco-Heat units will be put into mass production—and Delco-Heat dealers will be supported with a hard-hitting line of dealer helps, advertising and technical aids.

Mail the coupon below for full details of the Delco-Heat plan for dealers.

GENERAL MOTORS
DELCO-HEAT

Mail This Coupon Today!

DELCO APPLIANCE DIVISION, Dept. FH25
General Motors Corporation • Rochester 1, N. Y.

I am interested in the Delco-Heat plan for dealers.

Name.....

Street.....

City..... *State*.....

Buy U.S. War Bonds

fuel oil & oil heat

Mounting Military Needs Threaten Fueloil Supplies

LATEST DEMANDS of the Armed Forces for added petroleum products are taxing, if not exceeding the world capacity to produce. The newest requirement announced January 17 by the United Nations' oil control group was for an additional huge quantity of gasoline, of which 70% is 100-or-better octane for aviation, and 30% was 80-octane all-purpose gasoline. This requirement, for the moment at least, stretches world producing capacity unless further inroads are made on the already critical civilian supply.

Clearly, a large quantity of straight-run distillate will be needed to make the aviation gasoline and this will cut deeper into home heating fuels. Eastern stocks of heating oils at mid-January were critically low in certain important markets. New York harbor was operating on a day to day basis with marketing committees meeting each morning to spread as widely as possible the remaining stocks in the market. A number of fueloil distributors in that market, as well as in New England have been completely out of product and manage to get by with the help of neighboring plants which generously lend them their daily needs. Some mal-distribution is showing up, and a few oil men attribute this to an attempt to rigidly enforce Directive 59. They point out that this is the first season when every phase of the Directive has been enforced literally, and it is impossible during the rush period to make enough adjustments to coupon demand to get every distributor covered.

Indications of the worsening supply picture are seen in the cancelling of all reconversions. This has not been definitely announced, but is expected before February 1. The intent is to reinstate the privilege of reconversion as soon as the heating season is past. Not many people would reconvert at this season anyway, so in canceling the privilege, the industry is not much hurt, but the publicity attending this step is expected to help convince consumers that oil is actually scarce, and it may help check over-consumption which is still flagrant. Unfortunately, the optimistic publicity on supply in the early fall was carried in far more newspapers than have been the pessimistic statements of recent weeks, with the result that the public generally is not taking much precaution to turn down the thermostat. A ten-day supply limitation has also been recently announced for all but residential consumers. Larger buildings may not receive oil delivery if they have a ten-day supply, and this provision also limits dealers in getting bulk stocks. The only exception to the ten-day supply limit is public utilities who may have a thirty-day supply.

Residual oils in the East are just as tight as distillates and, in fact, tighter in the Boston harbor market. It is interesting to observe that every time residual restrictions have been relaxed, supplies have vanished so rapidly that within two or three months the Administration was in trouble. Last October when the residual users virtually got an "open door," it was recognized in Washington that based on past history we would probably get into trouble again, but large oil companies everywhere were crying for relief with their residual storage choked, and they all felt sure that this time there could not be further headaches caused by relaxing.

Drum shipments of kerosene to New England were just beginning to arrive in fair volume at mid-January. The shipments started from the Southwest in the Christmas week at about 3,000 barrels a day, and by the second January week were up to 10,000 barrels a day, but most of that product is enroute. There is considerable speculation in industry circles over who is going to unload the drum shipments when they arrive. The two largest drum-unloading plants, both in the Boston area, apparently will not operate this season because in the winter of 1943 they operated at a considerable loss to the primary suppliers who financed the extra cost, and who were unable to recover all of it from Defense Suppliers Corporation. Unloading drum shipments of kerosene is far more costly than normal bulk plant handling, and some provision must be made to care for all of this extra cost without passing it onto the public, although there is no immediate prospect of this being done.

There was considerable pressure in Washington to cut coupon values for Period 4, since stocks have dropped faster than intended. However, some additional transportation facilities have been made available during February, and, in view of the excessively cold weather, 10-gallon units are now set for Period 4. (Also Period 5 in Midwest and South).

Present outlook is that eastern distillate stocks will drop below 4,000,000 barrels by the end of March, which will mean a lot of dry spots. It is generally understood that when they fall below 5,000,000 barrels complete distribution is impossible.

The United Nations has a new three-year oil program for war purposes. This was announced at mid-January and calls for substantially increased quantities starting with the first quarter of this year. If the program is to be met, new well drilling and production generally must be stepped up markedly over the present high levels and it will also be necessary to build more refining capacity.

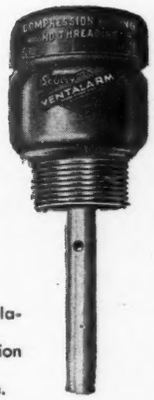
The Armed Forces give the impression

"Spills don't make friends"

No householder who has any pride in the appearance of his home wants oil smeared on the side of his house or running over his lawn. No woman wants the smell of oil, spilled in the basement, permeating her home. The hazard of overflowed tanks should be eliminated.

VENTALARM

T.M. REG. U.S. PAT. OFF.



TYPE LC

No threading. Available in ¾", 1", 1¼", 1½" and 2".

TYPE LC . . . for present installations. Cost $1.75 each. Installation cost approximately $1.00 each.

TYPE LA . . . for new installations. 1¼" only. Cost $1.50 each. No installation expense.

EQUIPPED FUEL OIL TANKS eliminate "spills," overflow, messing of lawns, oil and dirt tracked into the house. VENTALARMS assure safe, day or night, oil deliveries without inconvenience or driver entry into the home. VENTALARMS make fuel oil delivery and oil heating as automatic for the householder as her electric service. Hundreds of companies, including fifteen major oil companies, have equipped their customers' fuel oil tanks with VENTALARMS and have speeded up deliveries 33⅓%. Why waste men and trucks? Why jeopardize customer goodwill?

Your investment in VENTALARMS will return you a dividend of 100% yearly.

EVERY DOMESTIC HEATING FUEL TANK SHOULD BE VENTALARM EQUIPPED

IMMEDIATE DELIVERY

SCULLY SIGNAL COMPANY
88 FIRST ST., CAMBRIDGE 41, MASS.

of either being extremely optimistic or extremely pessimistic with never a middle of the road course. Early last fall when they were expecting the European War to end before Christmas, they were cutting back on many items of supply production and looking strongly to industrial reconversion. When the European war did not end as soon as was expected and, in fact, suffered considerable reverses in December, Washington thinking seemed to switch almost overnight to an acutely pessimistic view.

They have now outlined a new three-year supply program on the assumption that not only will the war last that long, but that daily supply needs will be considerably greater than they have been in the past. The petroleum difficulty in recent weeks has been attributed to shortage of transportation, but under the new three-year military supply program, there is going to be a serious shortage of over-all product with transportation a minor retarding factor. It is probably a safe bet that more successful operation in Europe for the next two or three months will cause the Washington pendulum to swing back again to more modest military demands.

GE Sees Homes Warmed by Heat Extracted from Cold Air

A UNIQUE METHOD OF HEATING a home by extracting heat from the outdoor air, even when the temperature outside is below freezing, is foreseen as being a definite commercial possibility in the near future and was declared to offer fuel economy and efficiency far surpassing present heating systems.

Report on the unusual process was given by G. K. Marshall, General Electric air conditioning engineer of Bloomfield, N. J., who said that several installations for this type system were made before the war and are still operating satisfactorily. He spoke before the Lehigh Valley Section, American Institute of Electrical Engineers.

Not only heating but year-round air conditioning is possible with the same equipment employed in this method, explained Marshall. Because the system actually produces heat by making cold air colder, there will be found, he said, many commercial applications where it will be economically advantageous to use both heating and cooling simultaneously. In residences, where both effects are not desired at the same time, the equipment can be made either to heat or cool, and it can be changed from one to the other.

Emphasizing the greatly increased output from such a unit, Marshall said that at about 52 degrees F. outdoor temperature, it will provide 4 times as much heat as was available in the electricity consumed. Even allowing 15 per cent for transmission losses between the generating station and the home, it will deliver at the 52 degrees F. outdoor condition 116 per cent of the heat that was in the fuel burned for supplying energy. Today the best steam generating plants have an over-all heating efficiency of approximately 34 per cent.

"As time goes on even more efficient equipment of this nature may be developed," he declared, "and it is not impossible to imagine that such installations may some day be required just from the point of view of conservation of our national fuel resources."

Basis of the process described is a heat pump, a refrigerating system in which advantage is taken of the heat given off in the process of cooling air rather than of the cooled air itself. In heating, the unit will realize a minimum of 87 per cent fuel efficiency, and, under some conditions, the fuel efficiency will exceed 100 per cent, which is better than that which can be obtained with the best domestic automatic fuel burning equipment at the present, Marshall said.

Underlying principle pointing to the possibility of using this reverse cycle refrigeration method for year-round air conditioning, with more efficiency and less fuel cost than is possible with present equipment, is the scientific fact that there is heat in the air at all times, in frigid winter as well as summer. Reverse cycle refrigeration, or, as it is more commonly called, the heat pump, works on the method of separating this heat in the air from whatever cold there is in the air, adding the heat produced by the electrical energy used to do this work, then piping the result through the house.

Similar results could be obtained with present electrical refrigerating equipment working in reverse, Marshall said. In these, heat extracted from the air is absorbed and then disposed of to permit the remaining cold air to lower the temperature inside an enclosed cabinet. In the heat pump, however, where the primary object is to warm the surrounding room, heat always present in the air is utilized and the remaining cold air thrown off.

Essential elements of a heat pump, according to Marshall, are an evaporator, a compressor, a condenser and a motor. In operation the heat pump draws in outdoor air through the evaporator, which contains a liquid refrigerant. Here the liquid refrigerant is boiled by the heat absorbed from the outdoor air and is changed to a gaseous form. This heated gas is fed to the compressor, where its temperature is increased by pressure. Discharged to a condenser, the refrigerant, now in a gaseous form, becomes a liquid again and in so doing transfers the heat it absorbed from the outdoor air to rooms of the house through appropriate ducts.

In regard to cost of operation, Marshall said, "Using power at 1 cent per kilowatt hour, the heat pump would have the same operating cost as coal at 14 dollars per ton, oil at 10 cents per gallon, manufactured gas at 40 cents per thousand cubic feet or natural gas at 80 cents per thousand cubic feet.

Heat pumps, Marshall pointed out, are not a new discovery. The principle on which they are based was first announced 92 years ago by Lord Kelvin, English mathematician and physicist. Interest in the idea lagged, however, until about 20 years ago when the development of the domestic electric refrigerator made engineers think of year-round air conditioning as something more than an idle dream. Since then interest has steadily increased and some installations have been made and operated successfully. Although commercial development of heat pumps is still in the idea stage, Marshall said, "To predict that in the next ten years a substantial proportion of our homes will not be heated by such units seems rash in view of the rapid development we have already seen in other types of home equipment.

PROGRESSIVE THINKING...

Was Responsible for "Progressive Rotation"

Another example of Silent Glow's farsighted and progressive thinking, coupled with precision manufacturing processes, is the development of the "progressive rotation" principle for the Air-Seel Burner.

In contrast to an oil burner that produces a straight line flame, the Silent Glow Air-Seel "progressive rotation" spirals the flame, thus increasing the distance which it travels, and the opportunity for the boiler to absorb heat.

Like many other exclusive Silent Glow features, this one contributes to fuel conservation, heating economy, and a sharp reduction of service calls and charges.

Instead of just building a good burner, Silent Glow has always endeavored to produce a *better* burner. That, we believe, explains the vast acceptance accorded to Silent Glow products by the public and oil burner dealers alike. We eagerly await the day when —once again—we may devote all our efforts to the manufacture of fine oil burner equipment. Until then our production must be geared entirely to the war effort.

Greater heat absorption is obtained with an Air-Seel burner because of the "progressive rotation" principle, illustrated above. This exclusive feature spirals the flame and increases the distance which it covers. The result is a far more efficient and economical heating system.

The SILENT GLOW
OIL BURNER CORPORATION
Hartford, Connecticut

fuel oil & oil heat

Do It Now

You Cannot Hire Salesmen, But You Can Get Ready

by
Ray Reynolds

WHEN the last Bazooka is fired in Europe, but long before the smoke of battle has cleared away, the opening gun of one of the greatest manhunts in all history will be fired in America, for American business will be out in force to recruit the largest national selling organization that any country has ever dreamed of.

Because of this unprecedented effort on the part of business generally and because of the effects that it may have on the manufacturers, dealers and distributors of the country, we have been asked to discuss the subject in these pages in the hope that certain facts and figures that are not generally available may help to act as a few guide posts to those whose business may have to withstand the impact of this violent crusade.

The size of the task that lies ahead for American business in sales recruitment can best be appreciated by comparing it with the biggest job of this kind that any of us have ever witnessed, namely the recruiting of our Army, Navy, and Air Corps.

Having watched the country start almost from scratch and recruit for these services upwards of 12,000,000 men and women, we civilians have acquired considerable appreciation of the magnitude of such an undertaking, but our education comes as something of a shock as we watch in full wonderment the assemblage of the thousands that crowded our stations and jammed our trains; marveled at the project as we saw it in the big city terminals of the country day after day and week after week until we began to feel that the entire manpower of the nation was marching off to war, but this great movement of personnel was only discernable to us because it was grouped and for the most part was uniformed.

The sales army that will be raised postwar will not move about in groups and will not be in uniform; consequently, it will never be detected or its size appreciated, but it will by coincidence be practically identical in size, which gives some idea of the stupendous job that distribution people will have.

Here are the figures: Before the war the national sales force (all types) numbered approximately 8,000,000. This has now shrunk to a skeleton force of under 3,000,000, but we shall have to rebuild to the former figure and then surpass it by 50% and reach a grand total of about 12,000,000 if a national postwar sales budget of $140 billion is to be realized and our social obligation of full employment assured.

Probable Time Lag

It may, however, safely be predicted that the really big guns in this sales manpower hunt will not be brought into play for some months following V. E. day, for the campaign will be retarded somewhat by the "accentuators of the positive" who feel that every last man of us will cash our war bonds and run screaming into the streets yelling for goods, gadgets, and what-nots without regard for price or a thought of the tomorrows, but the bubble containing this philosophy of foolishness will burst all too soon and in a quick about-face the jitterbugs of business will return to the conclusion that it takes a salesman to sell something.

If the figures just quoted gave a true indication of the competitive situation that will exist in the manpower market, we might feel no undue concern, for a 50% increase in our sales personnel is an objective well within the reach of any competent sales executive under normal conditions, but there is another side to the story. While our actual postwar requirements are approximately 50% greater than prewar, a checkup with many industry leaders indicates individual industry ambitions far exceeding this figure; for example, a vice president of an automobile company says his industry will attempt to raise their sales force after the first year, postwar, by 100% over the prewar high. Certain life insurance executives say that their prewar selling job has been terrible, that they have in force only about $1,000 per capita, that this is undemocratic, therefore they must start insuring the uninsured half of the population, that is the lower income groups as a social obligation, and that this will require three times the salesmen ever used before; the gas heating people, according to the statements of some of their spokesmen, are out to get the whole hog of automatic heating by employing two to three times the number of salesmen employed prewar. And the sales manager of one of the largest insulation companies claims that they will see to it that their distributor and dealers have four times the number of men on the hoof as ever.

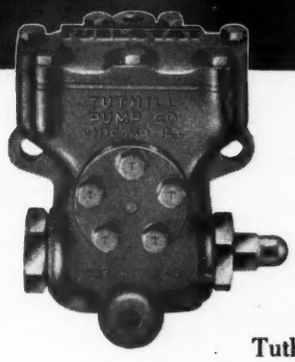
If these people mean what they say, and many are planning and even budgeting right now to prove their good or bad intentions, then a picture begins to unfold before our eyes of a nation gone stark mad in a wild endeavor to rebuild a sales force two or three times its former size on a foundation that sagged appreciably to the right under the weight of its previously inadequate structure.

Compete for Good Men

The distributors and dealers of oil heat, like the distributors and dealers in all other industries, will be right in the direct line of fire in this postwar competition for salesmen. This means that distributors and dealers may find that the competition for salesmen may well be more desperate and ruthless than the competition in sales. It means that each distributor and dealer must put his sales house in order and complete his plans as soon as possible, for it is quite evident that the old come-on story of 10% and carfare will hardly suffice to attract capable sales talent in the postwar world.

The returning soldier, sailor, or defense worker has had the opportunity during the war to see planning, training, and organization carried on on a very grand scale. It is, therefore, reasonable to expect that when these men return to business that they will not want to associate with dealers or distributors who are at-

Worth Waiting For



With new Tuthill Pumps and Fuelstats away at war, their older "brothers" serving the home front are demonstrating daily why Tuthill has always been known for dependability. Quiet operation. Leakproof performance. Maximum capacity with minimum power consumption. Proved durability. Long life. These are the qualities that have always characterized Tuthill Pumps and Fuelstats and make them worth waiting for . . . now.

TUTHILL PUMPS ARE SERVING ARMY • NAVY • AIR FORCE • MERCHANT MARINE

TUTHILL PUMP COMPANY

939 EAST 95th STREET • CHICAGO 19, ILLINOIS

fuel oil & oil heat

AVOID THIS!

use

MEL *Adjustable*

FUEL-OIL GAUGES

Model C

Patented MEL-GAUGES not only sell themselves but help sell installations. Their readily apparent expert workmanship and beauty is appreciated by all who see them. The exclusive *adjustable* feature tends to increase sales and promote customer goodwill.

Although MEL-GAUGES are manufactured from the finest materials available and appear to be a more costly type of gauge, they actually cost no more than ordinary gauges due to specialized quantity production. Be sure to compare the following features pertaining to *adjustable* MEL-GAUGES before placing your orders . . . GAUGE CAP—Best quality enamel stamped steel. INDICATING KNOB—*Adjustable* red fiber composition. FLOAT SUPPORTING ARM—Cadmium plated Bessemer steel. BODY—Clear transparent *unbreakable* plastic. DIAL—*Adjustable* white acitate tubing with gallons and quarters stamped in red. RODS—Finest quality rust resistant steel. BASE BUSHING—Precision threaded cast iron. ROTATING FLOAT—New style. Rust proof metal.

Mel-Gauge COMPANY

EAST HAVEN, CONNECTICUT

PLACE YOUR ORDERS NOW!

Don't let post-war product problems force you to accept inferior gauges. Write today for your free specification folder and place your orders as soon as possible to assure early post-war deliveries.

tempting to operate their business by the rule of thumb method without any definite plans or specifications. The dealer who intends to be adequately prepared to attract retail personnel should for this reason, as well as general business reasons, complete his sales plans for the future at the earliest possible date. As a matter of fact, time may prove that it is a little late even now. Nevertheless, for those dealers who have not completed their sales programs we would suggest the following as a safe line of procedure:

Analyze Market

(1) Get a black and white outline map of your city or territory; (2) Secure from the Chamber of Commerce, Real Estate Board, local newspaper, or U. S. Census Bureau, the number of owner-occupied dwellings in your territory over $3,000 valuation and their location, for these are your best prospects. (3) Draw territorial lines on your map (whether you intend to use sales territories or not, it will help you know your market). These lines should embrace areas that have approximately 2,000 potential buyers as described in No. 2. (4) You then determine the number of salesmen you need by the number of such blocks in your territory. After you know how many salesmen you need to cover your market, then and only then can you perceive what your manpower job will be. We might add further that if your figure tends to scare you that you had better adjust your thinking to it or reconcile yourself to the merchandising of a second-rate line of equipment for every first-rate manufacturer will be demanding full market coverage. (5) Having determined the number of salesmen you should employ, you are now ready to write your recruiting sales story, and we mean *write* it. We suggest that you write it as a letter to some young man overseas as if you were attempting to invite him to go to work with you when he returns. In this letter tell him how substantial the oilheating business is, how promising the market looks, how you will teach him the business and guide him during the early months, how you have a plan for helping him and other salesmen become dealers themselves after a few years' experience as salesmen with you. Tell him you are ordering a desk for him, and that you are preparing his place. Tell him everything that you think you could do for him, and

LOOK AT *THIS* RECORD!

3000 SQ. FT. OF RADIATION HEATED FOR $480 PER YEAR

The way to do a *better* job of heating *cheaper* is to install a B & G Monoflo Forced Hot Water System—and here, in proof, is another bit of air-tight evidence:

In this northern Wisconsin Monoflo installation, the church and detached parish house are heated by 3006 sq. ft. of radiation, divided into three zones. Two zones handle the church, while the parish house is on the third zone. The boiler is stoker-fired, with thermostatically controlled B & G Boosters keeping room temperature at the desired degree.

At only $480 per year for heating the buildings seven days a week, the operating cost of this system is amazingly low!

The economy of forced hot water heating is perfectly understandable when operating principles are examined. The most common cause of high heating cost is inability to closely control the heat supply. B & G Forced Hot Water Heating, because of its ability to *automatically and continuously* balance the heat output with the heat loss, never wastes fuel by delivering unwanted heat.

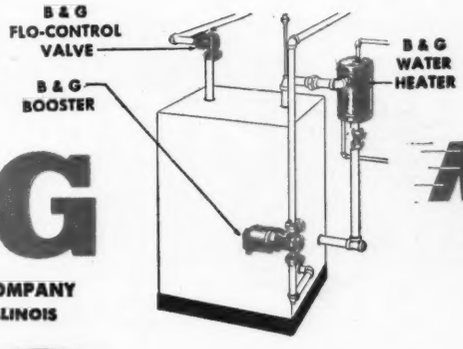
B & G Equipment now available for modernization

Any steam or hot water system can be quickly converted to B & G Forced Hot Water Heating. Materials have been released—a huge market is waiting. Get in now on this profit opportunity.

HOT WATER EVERY HOUR OF THE DAY . . . WINTER AND SUMMER

This is a plus value of B & G Forced Hot Water Heating! A B & G Water Heater, installed on the same boiler that heats the house, furnishes a virtually limitless supply of hot water for all household uses. Not only in winter, but in summer as well—and at insignificant cost.

The extremely simple equipment of a B & G Forced Hot Water Heating System is a warranty of dependability and low maintenance cost.



B&G

BELL & GOSSETT COMPANY
MORTON GROVE, ILLINOIS

MONOFLO

TRIPLE DUTY SYSTEM

fuel oil & oil heat

then vow to do it. As you write and rewrite on this theme, you will develop not only a sales recruiting story but you will be studying the most vital problem in your business, for your future as a dealer may well depend on your ability to attract and keep salesmen.

After working out this sales recruiting story, you should then start planning for the management and maintenance of your salesmen, for getting 'em is one thing and keeping 'em is another. The job of keeping salesmen happy, which is another way of saying how to keep them with you, is one requiring constant vigilance on the part of management, and we would like to point out that the problem is primarily one of morale, and morale is made up of a lot of little things. Many a man has sacrificed salary or income for an environment that suited his temperament or has put up with most unsatisfactory working conditions because of unusual earnings. We all know of many examples of this type which indicate that it is not always money, or love either, that keeps a man happy.

There are three fundamentals necessary to establishing the initial goodwill, confidence, and hope that the new salesman will need. These are (1) Compensation, (2) Training, and (3) Working conditions. At this point in your planning, you should call in your manufacturer and suppliers for they have plans and ideas from which they may be able to contribute something. And in regard to compensation, this will require the best thinking of all concerned and frequently cannot be settled without coordinate planning with your manufacturer. After the initial plans have been worked out, some consideration should be given to such long-range morale builders as: first, forced-savings plans; second, group insurance; third, assured prospect protection systems; fourth, sales promotion helps; fifth, personalized advertising for salesman; and sixth, incentives for continuous service.

This all seems like a very big job. This all seems like a lot of work, and we can honestly understand why the distributor and dealer, beset with all of his wartime problems and cares, may be inclined to put off until another day the serious, hard-headed planning that must be done. We feel sure, however that permanent and continued success in business in the chaotic years ahead will not be accomplished by hard work and good intentions alone. It will be accomplished by planning for men, for human nature being what it is, men always have and always will follow the man with a plan if it pertains to HIS future.

Wait till YOU see this latest development in RADIANT HEATING!

As announced previously, Burnham Boiler has something really "hot" on the fire for you! A revolutionary new idea in Radiant Heating which offers striking and sensational advantages over conventional methods and equipment.

How is it different? Why is it revolutionary?

BECAUSE:

It actually makes rooms more comfortable at lower temperatures — saves fuel — provides more healthful living conditions.

It is decoratively desirable — so inconspicuous as to be practically invisible.

It fulfills the engineering ideal of placement "where heat loss is greatest".

And it is 100% practical — easy to install — reasonable in price — and built for life-long, trouble-free service.

Burnham Boiler Corporation

IRVINGTON, NEW YORK, Dept. O • ZANESVILLE, OHIO, Dept. O

Export Department
50 CHURCH ST., NEW YORK 7, N. Y.

ARMY NAVY
Zanesville, Ohio Plant

INSTITUTE OF BOILER AND RADIATOR MANUFACTURERS · I·B·R · MEMBER

THE A. G. REDMOND CO., Owosso, Mich., has issued a new four-page specification folder. It covers standard Redmond Type "L" light weight, shaded pole AC Micromotors in sizes up to 1/40th horsepower.

BLACKMER PUMP CO., Grand Rapids, Mich., has put out a complete revision of their previous No. 304 bulletin. This bulletin, No. 306 gives complete facts about rotary pumps.

Harold F. Sheets has been appointed to the petroleum industry Foreign Operations Committee. *Mr. Sheets* fills the vacancy left by the death of *John A. Brown*, former president of the Socony-Vacuum Oil Co., New York. He had served as an alternate member since the Committee's inception in December, 1941.

Conserve Vital Man Hours

WITH

MONCRIEF FITTINGS!

DIE STAMPED · MACHINE MADE!

CUTS INSTALLATION COSTS!

BEST BY INSTALLATION TEST!

MONCRIEF · WARM AIR PIPE AND FITTINGS

Write For Catalog GF-44

WARM AIR
FURNACES
FURNACE PIPE
AND FITTINGS

MONCRIEF
SINCE 1895

AIR CONDITIONING
SYSTEMS FOR
COAL . . .
GAS . . . OIL

THE HENRY FURNACE CO. **MEDINA, OHIO**

fueloil & oil heat

THOUSANDS OF BOMBER PILOTS CAN'T BE *wrong!*

Triumph

MAGNETIC GAGES *for your* OIL TANKS Provide Aircraft Reliability

The Super-Fortress Pilot must be right—or else! After "Bombs Away!" he *must know* how much gas there is in his tanks. And, most often a Boston Auto Gage Company's gage is there to tell him—accurately, infallibly. This same dependability is available to you in RED HEAD Gages for oil tanks. They are noted for

EASY VISIBILITY

(From BOTH SIDES)

INFALLIBLE ACCURACY — SIMPLE, DURABLE CONSTRUCTION and LEAK-PROOF for FUEL and FUMES

The RED HEAD Gage has two large, easy-to-read dials—quickly legible from any direction at longer than normal distances. Its simple, sturdy construction assures a lifetime of continuously dependable use. The head and bonnet are heavy die cast. The magnet is oversize and guaranteed permanent. The gears are rust-proof—more than amply strong. It's positively leak-proof for fumes as well as fuel because the dial is actuated by magnetic force only, directly through solid metal flooring. And it's listed as standard by the Underwriters' Laboratories.

The RED HEAD is available in two types — Union Type and Screw Type—for 1½ inch or 2 inch pipe size openings, and for tanks from 22 to 45 inches in depth—and adaptable up to 90 inches depth.

Sold by leading dealers everywhere.

The BOSTON AUTO GAGE CO.

PITTSFIELD • MASSACHUSETTS

Makers of gages for any size or shape tank for Fuel Oil Burners, Automobiles, Trucks, Busses, Motor Boats, Stoves, Aircraft.

General Motors Estimates Postwar Burner Sales

ESTIMATES OF POSTWAR OILBURNER sales by the General Motors Corporation indicate a total of 2,432,720 domestic burners and units will be sold in the first five years after the war. This compares with FUELOIL & OIL HEAT's estimate of 2,493,000 for the same period, as revealed in the article "Oilheating Tomorrow" published in the October, 1944, issue. General Motors' heating study was made by the market research staff of the sales division at Detroit, and was computed on an entirely different basis than the FUELOIL & OIL HEAT estimate. The corporation's estimate for the five years is 60,280, or 2.4%, less than the publication's.

Heating studies were made on the products of General Motors' Delco Appliance Division, Rochester, N. Y., and cover gasfired furnaces and bituminous stokers as well as domestic oilburners and units. By projecting a ten-year record of sales of all these products it was found that an average of 1,035,200 pieces of this equipment would be sold in each postwar year. This amounted to 168% of the 1941 sales of gas furnaces, stokers and oilburners, which would be made up of a projected normal demand for each year, plus a part of the pent-up demand that has gone unsatisfied during the war years.

No attempt was made to distribute the total over each of the postwar years, but the average annual volume is calculated to be as shown in the table below.

OIL		
Conversion Burners ..	243,272	
Boiler units	91,098	
Furnace units	152,174	486,544
GAS		
Warm Air units	183,230	183,230
COAL		
Bituminous Stokers ...	365,426	365,426
		1,035,200

The calculations estimated a pent-up demand for 1,537,000 oil, gas and coal units by the start of 1945, which will be worked off at an average rate of 307,400 units per year, plus the normal demand. Since the estimate assumes 1945 as the first postwar year (contrasted with 1946 in the FUELOIL & OIL HEAT forecast) there will be a further pent-up demand before production again can be started. This additional demand, if distributed over the first five postwar years, probably would further narrow the small spread.

DOES YOUR SERVICE DEPARTMENT HAVE A MANPOWER SHORTAGE?

YOU CAN TAKE SERVICE BUSINESS WITHOUT DOING THE REPAIR WORK

by using G-E Factory Service Plans

EVEN if a scarcity of skilled repairmen has interfered with your ability to service fractional-horsepower motors, here's a way to get your share of this increasing wartime business.

These G-E Plans enable you to repair or replace, *quickly, economically,* and *expertly,* practically any G-E fractional-horsepower motor which has become inoperative, regardless of the type or make of appliance on which it is used. And there's no need for you to train repairmen—G.E. does the work, *quickly* and *reasonably,* and you know your profit beforehand. You render the service without actually making the repairs.

Investigate these simple and profitable Factory Service Plans. Learn how they're helping hundreds of other dealers to maintain business now and to build and hold trade for the postwar period. Ask your distributor for details today. Or, just fill in and mail the coupon.

Here are the FACTORY SERVICE PLANS for G-E fractional-hp motors

1. The Exchange Plan — Covers the most commonly used types of G-E fractional-horsepower motors. Makes possible immediate replacement, from G-E field stocks or from your own buffer stock. Replacement motors carry the G-E new-motor warranty, except for finish.

2. Special Service Repair Plan— Provides for factory repair of semistandard G-E f-hp motors not covered by the EXCHANGE PLAN, at established prices. Enables you to make quick, accurate, on-the-spot estimates. Repaired motors carry the G-E new-motor warranty, except for finish.

3. Regular Repair Plan— Covers f-hp motors not included in either of the other two plans, except extremely old or obsolete models. Inspection is made at the factory, and a cost estimate is submitted before work is started. These motors also carry the G-E new-motor warranty, except for finish. This plan rounds out this G-E service and enables you to handle repairs on practically any G-E fractional-horsepower motor.

General Electric Company, Section E700-76
Schenectady 5, New York

Gentlemen:

I'd like to know more about how your FACTORY SERVICE PLANS for f-hp motors can help me. Please send me a copy of your booklet.

Name .....

Company .....

Address .....

8260

FRACTIONAL-HP MOTORS

Buy all the BONDS you can— and keep all you buy

GENERAL ELECTRIC

fuel oil & oil heat

Fueloil Consumption Survey by State of Massachusetts

TO DETERMINE THE TREND in fueloil consumption among householders in Massachusetts, Richard P. Doherty, State Emergency Conservator, conducted a statewide survey on January 1. There had been reports of serious overconsumption and the Governor's office was anxious to learn its extent.

Doherty has a Fueloil Committee in every major city and consuming area throughout the Commonwealth. These local committees were asked to secure the cooperation of key oil companies in their communities. Each company supplied consumption data, based upon deliveries and home tank inventories, as of January 1, on 50 to 75 random sample accounts. A total of 1,850 samples was used in the final survey, and they were scattered throughout all principal cities.

The average family had consumed 38.2% of its full season ration allotment by January 1. Based on degree-day requirements and the normal ration schedule, not more than 36% should have been consumed, showing average excessive consumption of about 6%. Approximately 40%, or 2 out of every 5 families, had consumed more than 40%, and 12% of the families had used 50% of their ration. On the other side of the picture, 41% of the samples had stayed well within their ration program and had used less than 30% of their season's gallonage to January 1. The table shows the breakdown:

Percent of Ration Used to January 1	*Percent of Total Families*
Under 19.9	3.0
20—24.9	6.6
25—29.9	13.0
30—34.9	18.7
35—39.9	19.1
40—44.9	17.4
45—49.9	10.4
50—54.9	6.3
55—59.9	2.3
60—64.9	1.4
65—69.9	0.7
Over 70	1.1

DEALERS are responding enthusiastically to Herco's plan for their sales futures because

...Selling in the "bright new world" will depend on old, reputable names. They want to make Herco their chief line in post-war as in pre-war years.

...They want to make post-war sales and profits "stick" . . . with dependable Herco operation that requires minimum servicing. The new post-war Hercos will incorporate the proved Herco features—EXCLUSIVE HERCO THRIFTI-FIER, MERCOID VISAFLAME and HERCO UNIT ENGINEERING—with new design elements.

...They want the market protection which the Herco post-war dealership plan offers . . . assuring them an equitable share of new Hercos as soon as they can be released.

Consider the profitable Herco dealership plan in relation to *your* post-war prospects. Write for information today. No obligation.

HERCO OIL BURNER CORPORATION, Lancaster, Pa.

Your Present Plans Will Determine Your Post-War Profits—
Plan with Herco

HERCO
The Oil-Thrifty
OIL BURNER

British Oilheating Users Fare Better than Coal Users

FORTUNATE ARE BRITISH householders who heat with oil, in comparison to their neighbors burning solid fuels, according to a report from the prewar representative in England of Williams Oil-O-Matic Heating Corp. Paragraphs from his report follow:

"Like you, we had visualized at least 75% of our burners being put out of commission during the war through lack of parts or serious curtailment in the use of oil, but in actual fact the people who had oil burners in at the beginning of the war have been the lucky ones, since, although a regulation cut has been made to oil users, it has been a reasonable cut and there has not been the slightest difficulty of any single installation that we know of in getting the authorized ration of fuel. As you will probably know if you have studied reports of the fuel situation in this country, people burning solid fuel have not been so fortunate."

"Oil has, of course, gone up very considerably in price, but then so has our coal so that the relative positions seem to be very much the same, added to which, owing to shortage of domestic help, the automatic oil burner has again been a great boon in many houses and also in business premises and factories."

"Only a relatively small proportion of our oil burners have been removed since the commencement of hostilities."

U. S. Department of Labor Fueloil Prices November

FIELD INVESTIGATORS for the Department of Labor monthly check prices of principal fuels in several cities in each section of the country. Getting retail quotations from various suppliers in each market, the prices are averaged and published. Those in the table that follow were taken Nov. 15 (cents per gallon):

	Range	*No. 1*	*No. 2*	*No. 3*
Boston	10.60	10.40	9.00	9.00
Bridgeport	10.30	..	9.00	9.00
Fall River	..	..	9.70	..
Manchester	11.10	..	9.70	..
New Haven	..	..	9.00	..
Portland, Me.	10.20	10.12	9.00	..
Providence	10.30	10.22	9.00	..
Baltimore	..	9.72	9.00	..
Buffalo	10.40	10.40	9.50	9.50
Newark	..	10.25	9.00	9.00
New York	..	..	9.09	9.09
Philadelphia	..	9.90	8.93	8.91
Rochester	11.00	11.00	9.70	9.70
Washington	..	10.30	9.40	..
Chicago	7.96	7.45	7.45	7.45
Cleveland	..	8.55	..	8.03
Detroit	..	8.45	7.93	7.42
Des Moines	..	8.36	7.75	7.75
Milwaukee	8.50	8.50	8.00	8.00
Minneapolis	8.40	8.30	8.10	8.10
Omaha	..	8.10	7.60	7.60
St. Louis	8.47	7.75	7.55	7.55
St. Paul	8.30	..	8.10	8.10
New Orleans	..	8.72	7.21	7.21
Norfolk	..	10.00	8.80	..
Richmond	..	10.30	9.00	..
Denver	..	8.67	7.14	..
Portland, Ore.	..	7.30	6.30	..
Seattle	..	7.78	6.75	..

Conversions, Owners' Responsibility

FINAL DISPOSITION of the New Jersey case to fix responsibility for conversion from oil to coal under Government pressure was made with the January 4, 1945 decision of the New Jersey Court of Errors and Appeals. Under this decision the owner or landlord is responsible for all costs incurred in making the conversion. An earlier decision by the New Jersey Supreme Court had allowed the tenant $1,895 mechanical costs for the installation of a stoker, but had denied a fee of $300 for plans and supervision of the job.

In this case the Belmont Hotel, Newark, had leased a building from the New Jersey Title Guarantee and Trust Company complete with an oilfired heating system. The lease contained a clause making the tenant hotel liable for compliance with "all statutes, ordinances, rules, orders, regulations and requirements of the Federal, State and Municipal Governments * * * for the correction, prevention and abatement of nuisances, violations or other grievances * * *." The court held the forced conversion of the heating plant to coal did not constitute a violation of any code, and therefore the tenant could not be held liable for the conversion.

The final decision allowed the hotel to recover not only the direct cost of the installation which it had authorized and paid for, but also the engineer's fee of $300.

Tagliabue Mfg. Co. Bought by Portable Products Corp.

C. J. TAGLIABUE MFG. CO., pioneers in the manufacture of Industrial Control and Laboratory Instruments, has sold its assets, including goodwill, name and patents, to the Portable Products Corporation of Pittsburgh, Pennsylvania.

The progressive research and development policies in electronic and mechanical instrumentation which for so many years have characterized the Tagliabue organization will be continued under the

Yes.. WE CAN NOW ACCEPT POSTWAR BUSINESS...!
Without interfering with war work, we can now accept orders for transformers for use in connection with peacetime products.
If you have not already arranged for your postwar source of transformer supply, we suggest that you do so at your earliest opportunity. Send us your specifications for a quotation.
DONGAN ELECTRIC MFG. CO.
2981 Franklin
Detroit 7, Mich.
The Dongan Line Since Nineteen-Nine
WRITE FOR LITERATURE
DONGAN TRANSFORMERS

local management and personnel.

The business will be operated as a separate division of the Portable Products Corporation. Among the interests of the latter are manufacturing plants in Newburgh, N. Y., Philadelphia and Pittsburgh, Pa.

◈

James King has been appointed field sales engineer in the New York Factory Branch of General Controls Co., Glendale, Cal. His background includes many years of sales and service experience.

Underwriters' Laboratories 50th Booklet of Listings

THE ANNUAL ROSTER of all companies and their products having Underwriters' listings has just been published by Underwriters' Laboratories, Chicago, culminating the organizations fiftieth year of service to industry, 1894-1944.

The number of companies with listings on conversion oilburners has dropped during the past two years from 185 in 1942 to 148 in 1944. Those with listings on boiler-burner units, furnace-burner units and oilfired water heaters dropped during the same period from 67 to 63. Companies equipped to make complete units have large enough capital investments to warrant staying in business during war years, even though sales are few.

Of the 63 manufacturers making complete units at the close of the past year, 32 make predominantly vaporizing equipment and 31 make units with power burners.

The number of manufacturers of principal oilheating products now having listings are:

Product Listed	*No. of Mfrs.*
Conversion Oilburners	148
Oilfired Units	63
Industrial Burners	24
Space Heaters	36
Limit Controls	28
Safety Controls	16
Industrial Burner Controls	8
Draft Regulators	14
Oil Lift Pumps	5
Pressure Burner Pumps	12
Oil Filters	11
Oil Line Tubing	12
Constant Level Valves	5
Motorized Valves	11
Pressure Regulating Valves	4

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John Collins, PAW, Dies; Charles Harding Successor

JOHN D. COLLINS, director in charge of District I of the Petroleum Administration for War died on January 18 due to a heart attack, aged 52. *Mr. Collins,* a director and vice president in charge of sales of the Tidewater Associated Oil Co., N. Y., has been PAW director of the seventeen east coast states since June 5, 1944.

His successor as Director in charge of District I will be *Charles Harding* of the legal division of Socony-Vacuum Oil Co. *Harding* formerly occupied the District Director's spot in the early months of the Petroleum Administration's activities.

◈

C. V. *Coons,* sales manager of the eastern container division of Rheem Mfg. Co., N. Y., has been promoted to assistant director of sales of both the appliance and the container division of the company. *George W. Knight,* assistant to *Mr. Coons,* succeeds to the latter's post as manager of the eastern container division, and *E. W. Manstrom,* recently discharged from the Army, has been named assistant to *Mr. Knight.*

Less Time *Here!*

Full I. D. Means Faster Flow Through

"NEWTYPE CORD" Fuel Oil Hose

Time required at each customer's tank is a great deal LESS with the FASTER FLOW provided by "Newtype Cord" Fuel Oil Hose. Kinkproof, non-flattening construction and a "Synplastic" Tube that will not swell under contact with oil, assure a full inside diameter at all times, with oil delivered at maximum speed and volume. Light weight, easy to handle . . . and a cover that will take plenty of punishment. Equip your trucks, now, with "Newtype Cord," and profit by the QUICKER DELIVERIES its use guarantees. Available in all standard sizes and required lengths.

Contact Our Nearest Branch or Main Office for Details and Prices.

GOODALL RUBBER CO., Inc.

MAIN OFFICE: 9 South 36 St., Philadelphia 4, Pa.

THE GOODALL-WHITEHEAD COMPANIES

New York - Chicago - Pittsburgh - Boston

Goodall Rubber Co. of Calif. Goodall Rubber Co. of Texas

Factory—Trenton, N. J. Established 1870

WE ARE PARTICIPANTS IN THE OWNERSHIP AND OPERATION OF NATIONAL SYNTHETIC RUBBER CORPORATION

75 Years of "Know How" — Our Most Valuable Commodity

AN UNFAILING ADVANTAGE

Whatever your control requirements may be, it is conceded that dependable performance is not only very desirable, but most essential ● Inasmuch as automatic heating equipment is wholly dependent upon the controls governing it, a careful check and comparison should be made in their selection ● The switch in a control warrants first consideration, due to its functional characteristics. All Mercoid Controls are equipped exclusively with hermetically sealed mercury switches of special design and critically selected materials ● Mercoid mercury switches are known the world over for their dependable service. They are not affected by dust, dirt or corrosion; nor are they subject to open arcing with its attendant consequences of pitting, sticking or oxidized contact surfaces, all of which, are likely to interfere with normal switch operation ● That is why among other things, Mercoid Controls on the whole give you assurance of better control performance and longer control life—a distinct and unfailing advantage—the reason why they are also the choice of America's leading engineers for many important wartime industrial applications.

THE MERCOID CORPORATION · 4229 BELMONT AVENUE · CHICAGO · 41 · ILLINOIS

Industry Meetings

Activities of local and national industry associations will be reported monthly in this department. Secretaries are invited to send reports of their group's activities, to reach the editor by the 20th of the month.

Northwest Petroleum Ass'n.

IN A TWO DAY annual convention at Hotel Raddison, Minneapolis, January 4 and 5, the Northwest Petroleum Ass'n. heard nine speakers on current industry topics and reelected its three principal officers. Elwin Hadlick is president and secretary, C. W. Johnson of Rex Oil Co., St. Paul, treasurer, and H. F. Horning, assistant secretary. Four new directors elected were R. G. Cornelison, Duluth, Don Dickey, Wayzata, Minn., Carl Hvidsten, Grafton, N. Dak., and Jacob Wolf, Fredonia, N. D.

Burning Oil Distr's Ass'n.

AT ITS ANNUAL MEETING December 28, Burning Oil Distributors Ass'n., Chicago, reelected for the eleventh successive year its four principal officers. They are Frank E. Spencer, Socony-Vacuum Oil Co., president, J. Loeffler, Commerce Petroleum Co., vice-president, R. E. Curran, Suburban Oil Co., treasurer, and F. B. Caldwell, secretary.

Spencer, Loeffler, Curran and C. I. Johnswald were reelected directors. Other directors, who have served one-half of a two year term, are Charles S. Rosenthal, Apex Motor Fuel Co., D. G. Malone, Petroleum Heat & Power Co., and O. L. Peterson, George C. Peterson Co.

Wisconsin Oil-Heat Ass'n.

AT A STATE-WIDE industry rally and dinner January 26 at Milwaukee's Hotel Wisconsin, the Wisconsin Oil-Heat Ass'n. heard C. E. Lewis, president of Oil-Heat Institute of America, outline the implications of oilheating's progress in the postwar era. The Association's president, Walter J. Schroeder, and secretary H. M. Mottram were in charge of arrangements.

Independent Oil Men's Ass'n. of New England

OLDEST OIL MEN'S ORGANIZATION in the Country, the Independent Oil Men's Association of New England held its 51st annual meeting with a dinner at Boston's Hotel Kenmore on January 10. John W. Scott, president, related something of the group's early background, and Clyde G. Morrill, executive director, reported on the current stringent supply situation.

Major George Kimball, a former member of the group, but now on active duty as director of petroleum supply for the Army in the China-India theater, was presented as a guest.

Richard Doherty, State Fuel Conservator, described briefly the reecnt statewide survey on overconsumption of fueloil (reported elsewhere in this issue). A nominating committee composed of Fred Bergfors, chairman, Dyke Knox and Bert Hallinan submitted recommendations for officers and directors for 1945. These were unanimously elected.

Robert Gray, business manager of FUELOIL & OIL HEAT, discussed at some length four current situations, not evident before the war, and their probable effect on oilheating in early postwar years.

Officers elected were John W. Scott, of Buckley & Scott, Watertown, Mass., president for a sixth term, Glen Arnold, Petroleum Heat & Power Co., Boston,

FEWER FREE SERVICE CALLS---
MORE PROFITS FOR YOU!

Thousands of alert dealers are cashing in, this winter, with SILOO FUEL OIL TANK SOLVENT—the *scientifically designed,* positive acting treatment for cleaning fuel oil tanks and heating equipment. SILOO dissolves the petroleum residues that naturally accumulate in tanks and clog lines and filters . . . keeps the entire system water-free . . . removes polymerized gums and acts as an inhibitor against electrolysis.

Dealers who service their customers tanks with SILOO profit *three ways:* first, make fewer free service calls; second, build lasting good will and third, earn more cash profits. SILOO passes all fire underwriters' requirements—is absolutely harmless to fuel and mechanism. Write today for complete information and dealer proposition.

PETROLEUM SOLVENTS CORPORATION
Tank Solvents Division
Solvents For All Types of Petroleum Residues
GENERAL OFFICES: 331 Madison Avenue • New York 17, N. Y.

Manufacturing

To produce progressively better and better goods is the aim of all forward-looking manufacturers.

Luxaire's purpose from the very beginning has been and always will be the manufacture of better heating and air conditioning equipment. This is a definite, well-established Luxaire plan.

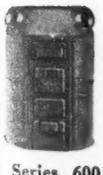
In the production of war equipment, this plan has enabled Luxaire to deliver such equipment in greater quantities in less time and at a saving in critical materials as well as valuable manpower.

When peace returns, this same plan of progressive manufacturing will make possible a greater production of Luxaire products in less time and at lower cost—benefits which will be directly reflected in the profits of those who sell and install Luxaire heating and air conditioning units.

Luxaire

THE C. A. OLSEN MANUFACTURING CO. ELYRIA, OHIO

THE PRE-WAR LINE OF LUXAIRE WARM AIR HEATING AND AIR CONDITIONING UNITS FOR COAL, GAS, OIL



Series 600 Coal Fired Steel Gravity Furnace

Series C Coal Fired Cast Gravity Furnace

Series 700 Coal Fired Steel Gravity Furnace

Series AC-700 Gas Fired Steel Air Conditioning Unit

Series A Gas Fired Steel Air Conditioning Unit

Series G Coal Fired Steel Gravity Unit

Series H Gas Fired Steel Utility Air Conditioning Unit

Series 8000 Oil Fired Steel Air Conditioning Unit

vice-president, Paul Strang, Community Service Stations, Newton Highlands, Mass., secretary, and Clyde G. Morrill, treasurer and executive director.

Directors are Fred Bergfors, Quincy, Mass., Warren Keith, Brockton, Mass., John Birmingham, Boston, Phillip Dalrymple, Lawrence, Mass., Wesley Downing, Boston, Harold Hadley, Worcester, George Williams, Springfield, George LaPointe, Manchester, N. H., George Stetson, Middletown, Conn., Fred Wetstine, Pawtucket, R. I., and Harold Harrup, New Bedford, Mass. Eben Lufkin of Boston was elected convention chairman.

Nine Local OHI Meetings

JACK HESS, managing director of Oil-Heat Institute, is currently conducting a series of nine meetings with local chapters of the Institute in the Midwest and on the West Coast. He is explaining to the dealers attending these sessions current progress on many of the common Industry problems, such as the acute difficulty of getting burners in early months, the necessity of stretching sparse supplies of burners and parts to serve absolutely essential situations, service manpower shortages and proposed service training programs, gas competition, oil supply and character, etc.

Cities, dates, names and addresses of the local chapters where the talks are being made follow:

1/29 *Chicago, Ill.*
Burning Oil Distributors Ass'n.
Chicago Oil Burner Ass'n.
616 S. Michigan Avenue

1/30 *Minneapolis, Minn.*
Oil Heat Institute of Minnesota
Twin City Oil Burner Association, Inc.
848 Builders Exchange

2/ 2 *Seattle, Wash.*
Oil Heat Institute of Washington
2155 Northlake Avenue

2/ 5 *Portland, Oregon*
Oregon Fuel Merchants Association
1221 Failing Bldg.

2/ 8 *Oakland, Calif.*
Western Burner & Oil Distributors Ass'n.
1625 North C Street, Sacramento

2/13 *Omaha, Nebraska*
Oil-Heat Institute of Nebraska
705 Security Mutual Bldg.

2/14 *Kansas City, Mo.*
Missouri-Kansas Oil Heat Institute
203 Balcony Bldg.

2/15 *St. Louis, Mo.*
Oil-Heat Institute of St. Louis
1430 S. Vandeventer Ave.

2/16 *Indianapolis, Ind.*
Oil Heating Division,
Electric League of Indianapolis, Inc.
715 Electric Bldg.

2/19 *Cincinnati, Ohio*
Oil-Heat Institute of Greater Cincinnati, Inc.
100 Southern Bank Bldg.

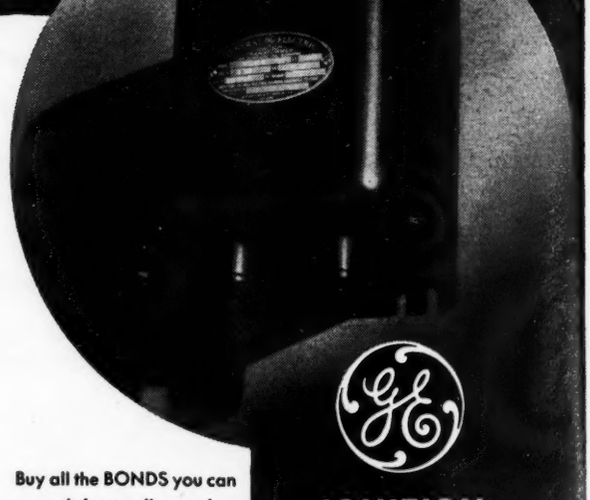
2/20 *Cleveland, Ohio*
Oil-Heat Institute of Northern Ohio
3083 Broadway

Mass. Oil Heating Ass'n.

THE ANNUAL MEETING OF the Massachusetts Oil Heating Ass'n. was held at Boston's Fox & Hounds Club on January 16. The principal speaker was John W. Schulz, consultant and technical editor of FUELOIL & OIL HEAT, who discussed the design and application of combustion chambers for oilfiring.

Officers for 1945 elected at the meeting were Fred W. Heaney, Buckley & Scott, president, Earle R. Gabeler, White Fuel Corp., vice-president, and Fred N. Beckwith, secretary-treasurer. (Beckwith is also secretary-treasurer of the Oil-Heat

PLAN NOW TO GIVE YOUR POSTWAR OIL BURNERS THESE *Extra* SALES FEATURES



Positive ignition, even under such adverse conditions as low line voltage (as low as 70 per cent of normal), heavy oil at freezing temperatures (as low as −10 C), cold spark point, and oil film on spark point, etc.

Exceptional freedom from radio interference—The Class E design (electrostatically balanced) has the midpoint of its high-voltage winding grounded, and a grounded electrostatic shield is incorporated between the high- and low-voltage windings.

Increased safety—A shockproof installation can be obtained without use of insulating caps or metal terminal shields.

Neater installations—Plug-type terminals simplify connections. Available for universal mounting, as shown, or with studs for concealed mounting. High-voltage circuit can be completely enclosed.

Is your file of ideas for postwar improvements up to date?

Bulletins GEA-912D, GEA-2587, and GET-1004 will bring you complete design and product data to add to your file of ideas for postwar improvements. General Electric, Schenectady 5, N. Y.

Buy all the BONDS you can —and keep all you buy

IGNITION TRANSFORMERS

GENERAL ELECTRIC

Institute of New England and chairman of the Legislative Committee of OHI of America's Distribution Div.)

Directors elected were John Ivester, Bell & Gossett Co., A. J. Hally, May & Hally, Inc., Max Seltzer, Seltzer & Co., N. A. Burkhardt, Frost Coal & Oil Co., T. G. Colter, Dole Valve Co., H .S. Carragher, Carragher Bros. and J. L. Gamble, Cities Service Oil Co.

National Warm Air Heating & Air Conditioning Ass'n.

THE FOURTEENTH ANNUAL Warm Air Conference of NWAHACA scheduled to be held at Michigan State College, East Lansing, Michigan, March 19-22, inc., has been cancelled, at the request of the Office of Defense Transportation, due to travel conditions.

◈

HARBISON - WALKER REFRACTORIES CO., Pittsburgh, Pa., has published a booklet containing a description of characteristics of the Company's several types of firebrick, insulating brick and high temperature bonding mortars.

Bench Tests

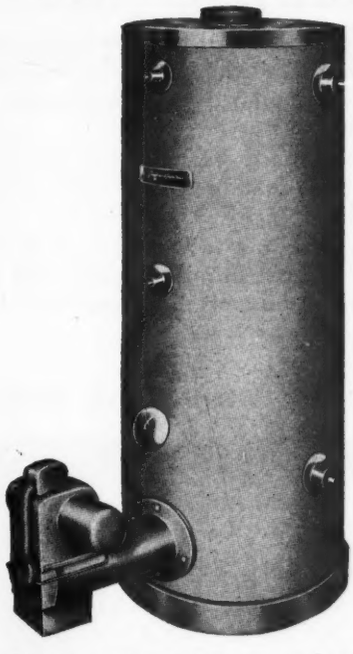
(*Continued from page 40*)

fuel unit strainer connection (see diagram). Also, fit the fuel unit with a pressure gauge. With the fuel unit running normally and the suction line valve wide open, rid it of air and set the atomizing pressure at 100 lbs. Then close the suction line valve tight and observe the maximum reading on the vacuum gauge. In condition equal to new, the pump should develop a vacuum of at least 27". The maximum reading counts; a pump passes the test if it develops a 27" vacuum for only part of a minute and then the reading decreases. Standards are different with different burner experts, but it is safe to conclude that a pump that fails to produce a 25" vacuum should be rebuilt or discarded. Make sure of these things in using this test: The pump must be chuckful of oil, not partially air-bound, before the suction line valve is closed; there must be no air leaks in the suction line or fuel unit; and the vacuum gauge used must be dependable. Fussy experts use large U-tube manometers, filled with mercury, to check on the accuracy of the vacuum gauges they depend on for such tests.

The dealer who has boxes and piles of burner parts accumulated in his shop usually can use bench-testing to put hundreds of dollars worth of hard-to-get parts back in circulation, and to add to his service profits. Parts found to be in good condition can be cleaned, painted, labelled as A-1, and turned into cash as the need to use them arrives. Parts in need of simple repairs, such as strainer cleaning, gasket replacement, or tightening-up, can be tended to by the dealer's employees. Parts in need of complete rebuilding that may call for the use of special parts or special tools should be sent out to specialists for reconditioning that will put them in condition guaranteed to be equal to new. Or again, the dealer may make use of the arrangement now featured by certain companies that rebuild oil burner parts, and exchange certain defective parts, of types no use to him even in good condition, for other kinds of parts needed in his everyday service work. For hundreds of dealers, there's enough money hidden in burner parts scrap heaps to turn out real profits for the service department!

SHEPHARD "PERCOLATING" HOT WATER HEATERS STEAM AND HOT WATER BOILERS

FAMOUS FOR STURDY CONSTRUCTION, QUICK RECOVERY, LOW COST OPERATION AND STREAMLINE BEAUTY



The Government Has Purchased Thousands of Them

The percolating method engineered by Shephard, produces 20 gallons of water 90° rise, for one penny with fuel oil costing 7½c per gallon.

Distributors and wholesalers: some territory is still available, write today for descriptive literature, state territory you cover —it may be open.

Capacity water heaters: 65, 125, 175, 300, 500 GPH 90° rise. Capacity steam boilers: 300, 450, 650, 1150 sq. ft. radiation. Capacity hot water boilers: 450, 650, 1050, 1750 sq. ft. radiation. All models equipped with gun type burners with automatic controls.

All orders are filled sequentially—place your orders early for best deliveries.

SHEPHARD HEATER CO. 6624 SOUTH PARK AVE. CHICAGO 37, ILL.

with

NEW PRODUCTS . . .
NEW SELLING IDEAS

There's a race going to start one of these days . . . a race among all the oil heating dealers in your community, to see *who* will be first in the market with a modern, NEW postwar line. ONE dealer will WIN—will clean up some real money by stepping out and grabbing the cream of the postwar sales ahead of his competitors.

There's a war to be won first—we all know that. The race cannot start until V-Day, when the government gives the O.K. to both manufacturers and dealers. But if you want to win the race in *your* town, team up, *now*, with Master Kraft.

The Master Kraft postwar line is NEW—yet thoroughly tried out in war service. It incorporates startling advances, to make your selling easy, your installations simple, your profits greater. Master Kraft Dealers will be backed by a forceful advertising campaign, bristling with new selling ideas, tailor-made to fit the postwar market.

If you want to set the pace in your community, postwar, write us NOW.

MEANTIME—WORK FOR VICTORY—AND BUY MORE WAR BONDS!

HARVEY-WHIPPLE
INCORPORATED
SPRINGFIELD, MASSACHUSETTS

Viscosity Tests at 75°F Proposed for Heating Oils

AT A RECENT MEETING of the Technical Committee of ICHAM, R. W. Johnson, of Automatic Products Co., discussed the problems encountered due to the varying viscosity of fueloils and accurate control of the flow of fueloil to the burner. It was suggested that the paper be sent to the members of the Technical Committee, and the following is a resume of this discussion.

One of the most difficult problems encountered in the proper control and metering of light fueloils is the variation encountered due to changes in temperature and viscosities in the fueloil used throughout the country. We have noted recently that in testing fueloils which are in common use that there is a difference in temperature flow curves which result in a greater percentage of flow error at lower temperatures.

At the present time under the ASTM method D-445-42T, all viscosity checks are made at 100°F. We feel that a better uniformity of flow through the control could be maintained if the viscosity flow tests were made at 75°F. Our reasoning in arriving at this conclusion is as follows:

Four different oils were obtained with viscosities of 1.74, 1.891, 2.108 and 2.36 centistokes at 100°F. On the four oils the viscosity readings were taken at temperatures from +50° to +100°F. and the readings recorded as shown in the table.

It is noted from the results tabulated and the curve sheet shown that the curves do not run parallel and that there is considerable difference in the viscosity of the oils from 50°F. to 100°F., and also that the percentage change is greater with the heavier oils than with the lighter oils.

It is also to be noted that the variation between "A" and "D" oil at 100°F. is .62 centistokes, and the variations at 75°F. is .88, and at 50°F., 1.424.

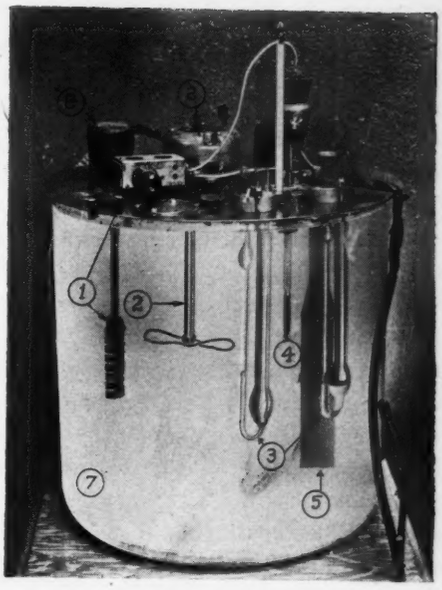
These curves will vary with the oils distilled from various crudes throughout the country.

It is therefore our suggestion that the viscosity tests on these lighter oils be taken at 75°F., which is nearer the operating temperature; space heaters in living rooms may be somewhat above this temperature, and a furnace or water heater located in the basement may operate below this temperature.

The test method and apparatus used in our laboratory is practically the same as the ASTM method D-445-42T, which is recognized procedure for all light fueloils of No. 1, No. 2 and No. 3 grade. Saybolt Universal is not sufficiently sensitive for these lighter fuels.

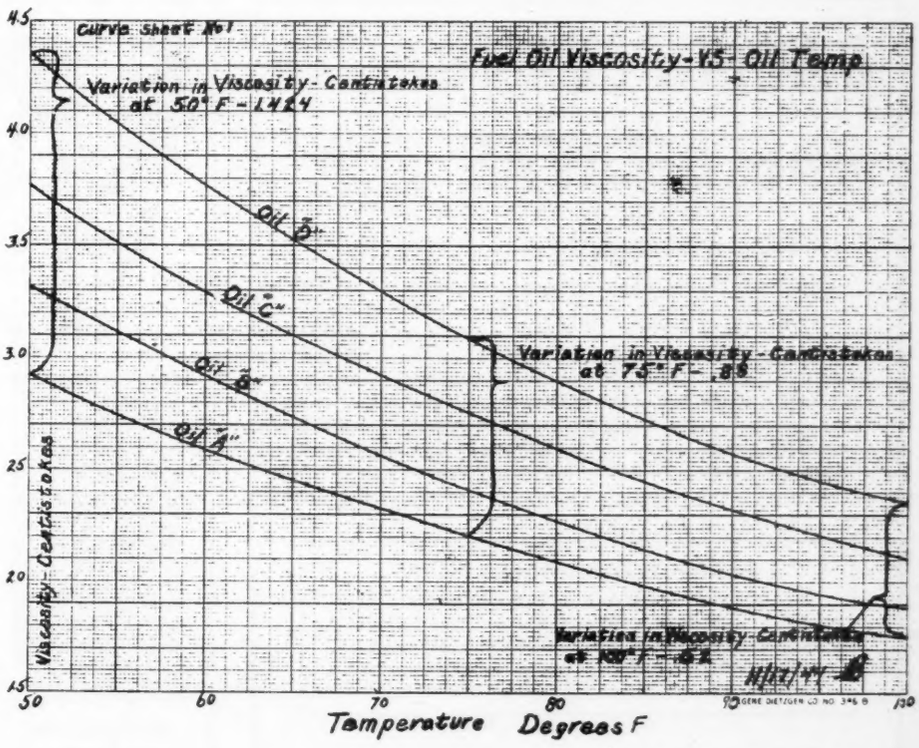
Should the Technical Committee decide that viscosity readings should be taken at 75°F. instead of 100°F., the figures in the following method should be changed to 75°F.

The viscosimeter consists of a large glass jar filled with water which is kept at a constant temperature by means of a thermostatically controlled immersion heater. A motor driven agitator is used to keep the water in constant motion. This assures a uniform temperature throughout the entire quantity of water and



Viscosimeter

avoids "hot spots." In the water is suspended a glass pipette with an accurately sized orifice which allows the oil to flow at a predetermined rate. The rate of flow is represented by the factor .012609 for the pipette that we are using. A thermometer graduated in Fahrenheit degrees with a temperature range of 97.5°F. to 102.5°F. with subdivisions of 0.1°F. is



Temp. F.	Vis. Oil A	% Change Oil A	Vis. Oil B	% Change Oil B	Vis. Oil C	% Change Oil C	Vis. Oil D	% Change Oil D
+ 50°	2.916	67.4 %	3.301	74.6%	3.769	79.0%	4.34	84.0%
+ 60°	2.69	54.6 %	2.922	54.3%	3.297	56.4%	3.75	58.8%
+ 70°	2.335	34.2 %	2.56	35.2%	2.917	38.3%	3.288	39.3%
+ 80°	2.096	20.4 %	2.284	20.8%	2.595	23.2%	2.89	22.4%
+ 90°	1.896	8.95%	2.06	8.9%	2.323	10.2%	2.579	9.3%
+100°	1.74		1.891		2.108		2.36	

immersed in the water in the jar.

Each time a test is made the pipette is emptied by means of a vacuum pump which draws the oil out after the test is made. The pipette is then flushed out with ether so that no particles of oil are left. The ether is then drawn out with the vacuum pump until the pipette is clean and dry.

Exactly 3 cc of the oil to be tested is placed in the pipette and allowed to remain in the pipette for about 5 minutes so that the oil is the same temperature as the water. The oil is drawn into the upper part of the pipette, with the vacuum pump, until the top level of the oil reaches a mark etched on the glass. The oil is then allowed to flow back into the bottom of the pipette. The rate of flow is measured in seconds from the etched mark at the top to the etched mark at the bottom of the pipette. This is done by means of a stop watch calibrated to 1/10 second subdivisions. For example, it takes oil of a certain viscosity 164.2 seconds to pass from the upper mark to the lower mark. This number of seconds is multiplied by the above mentioned constant factor, .012609.

Results: .012609 x 164.2 — 2.0703978. This is the viscosity of the oil in centistokes.

KINEMATIC VISCOSIMETER ASSEMBLY

1. Thermostatic control — accurate to within 0.2% #99012—Central Scientific Co. $12.00.

2. Stirring Device — Economy Stirrer #5770—Central Scientific Co. $7.50.

3. Modified Ostwald Viscosimeter Uncalibrated #S-83335—E. K. Sargent Co. Series No. 100. $4.50.

4. Fahrenheit Thermometer #55452 —C. J. Tagliabue Co. $12.50.

5. Heating Element controlled with thermostatic control #16550—Central Scientific Co. $5.00.

6. Fine mesh filter to prevent dust or other foreign material from getting into Ostwald tube.

7. Pyrex Jar—S-43715—E. H. Sargent Co. $6.00.

8. Simple cover to protect Ostwald tubes from dust when not in use—any cup.

9. Vacuum pump #246 Oilifter Automatic Products Company, or any good vacuum pump.

10. Formica grade XXV plastic cover with holes drilled for various instruments, to fit on the Pyrex Jar.

◈

Additional Production Awards to Burnham & Gilbert-Barker

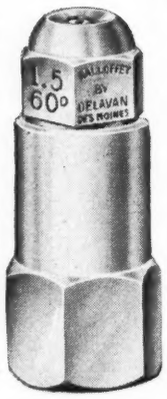
BURNHAM BOILER CORP., Irvington, N. Y. received on January 6 a star award to be added to its Army-Navy "E" pennant for continuing excellence in war production. Its original award was on July 4, 1944.

Gilbert & Barker Mfg. Co., West Springfield, Mass., has just received its fifth Army-Navy production award and a fourth white star has been added to the "E" flag which was raised above the plant in July 1942.

◈

Jack W. Steele has retired as director of the Petroleum Conservation Division. He will be succeeded by *Edward B. Swanson*, formerly an associate conservation director, who will also continue his present duties as Director of Research for PAW.

BALLOFFET NOZZLES NOW BY DELAVAN



Because of the Balloffet design, precision manufacturing methods, and accurately controlled test procedures, Balloffet nozzles are dependable and uniform as to rating and spray quality.

PLACE YOUR ORDERS NOW

. . . either with Delavan or Balloffet. Delavan has been exclusively licensed (under the Balloffet patents) to manufacture and sell Balloffet nozzles. Our war production will allow deliveries to start shortly.

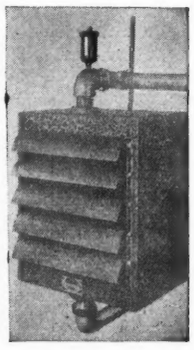
DELAVAN Engineering Co.

DES MOINES, IOWA

DE C

And Keep It Out With

AUTO-VENT AIR ELIMINATORS



Venting Hot Water Unit Heater

Circulation Troubles?

Don't fight air pockets or traps in hot or cold circulating lines! "Get that air out of there" *and keep it out* simply by installing the No. 7 Maid-O'-Mist Automatic Air Vent. This reliable air vent has a self-closing float-controlled valve and is designed especially for circulating pipe lines, convector radiators, unit heaters, cooling manifolds, tanks, diesel engines, or any other application where air pockets or traps retard the free circulation of liquids. For pressures up to 75 lbs. Now available in bright brass finish.

APPROVED FOR NAVY, MARITIME COMMISSION AND ARMY USE

MAID-O'-MIST INC.

AUTOMATIC HUMIDIFIERS FOR ALL TYPES OF HEATING SYSTEMS

213 NORTH ABERDEEN STREET
CHICAGO 7, ILLINOIS

CONGRATULATIONS...

ON BOTH YOUR FINE WORK AND FORESIGHT ON THE PAYROLL SAVINGS PLAN!

IN your wholehearted support of the Payroll Savings Plan, you are doing far more than backing the most valid system of war financing—and building a powerful dam against the onrush of dangerous inflationary dollars.

By encouraging the all-out participation of your employees in this greatest of all savings plans, you are helping to create a sound economy for post war days.

With this same plan, you are assisting working America to build a mainstay against the inroads of unemployment and want—to save for homes, educational advantages and old age comforts!

You and your employees, through *mutual* cooperation in this forward-looking plan, are gaining a new and closer understanding—the cornerstone of a firmer, *mutually* profitable relationship!

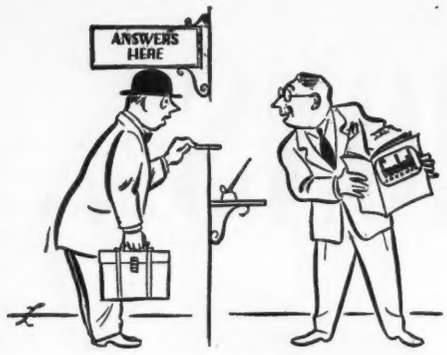
National benefits, too, follow the "All Out" effort you are making! The prosperity of our United States rests on the economic stability of both management and labor. Your Payroll Savings Plan is working constructively toward the assurance of both!

The Treasury Department acknowledges with appreciation the publication of this message by

FUELOIL & OIL HEAT

★ *This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council* ★

fueloil & oil heat



Reader's Problems

Q. Some time ago we changed a hot water generator and storage tank on a vacuum heating system to a tankless water heater. Since then we have been troubled by the heating of the radiators close to the boiler. This occurred in summer, and we had continual complaints about it.

We tried opening the vacuum but that didn't help. We reasoned that the Aquastat might be calibrated incorrectly, and we replaced it. But none of these steps eliminated the trouble.

We would appreciate your outlining the remedy, and thank you for any help you may be able to give us.

C.C.C., *Joplin, Mo.*

A. We believe you indicate that this installation heated the tank properly in summer before you installed the tankless water heater. Therefore we assume that the boiler has a manifold which is connected to every section, if it is the type of boiler which needs such a manifold for year-round water heating service.

The basis of the trouble is plain. At the time the boiler temperature control stops the oil burner in summer, the boiler has been heated excessively and is producing steam enough to heat some of the radiators. True, some parts of the boiler may be cooler than others, and the boiler temperature control may be on a cool part of the boiler or the piping connected to the boiler.

For a remedy, first try simply setting the boiler temperature control lower, even though this leads to a setting of 150 or 160, so that the oil burner stops in summer before the boiler generates enough steam to heat the radiators. By feeling the boiler with your hand, check on some parts of it being cooler than other parts. If the boiler heats unevenly, disregard the numbers on the boiler temperature control and set it so that the boiler is barely simmering at its hottest parts when this control stops the burner. Whether the control is on a hot part of the boiler or piping or a cool part, you will have to use a control setting lower than the one you used in the past, which caused the radiators to heat in summer.

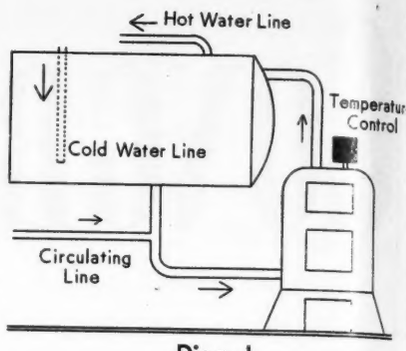
Then again, you may find it necessary to install the control on a hotter part of the boiler. At present, for example, the control temperature may be 170° when the hottest water in the boiler is simmering or steaming.

Consider this: On some installations, the use of an immersion type boiler temperature control, in place of a strap-on or contact type, gives the close control which is needed to obtain a satisfactory output from a tankless type water heater. You may find it necessary to switch to an immersion type control. If you do, bear in mind that a control which permits adjusting the differential will give advantages on this installation, and try to install the control where it will be affected by the hottest water in the boiler.

The general principle is that the control must stop the burner before the boiler has generated sufficient steam to heat any of the radiators. Next, the control must start the burner before the boiler has chilled to the degree that results in too-cool water from the hot water faucets. With the boiler kept at a temperature about ten degrees cooler than gives steam to the radiators, there should be plenty of hot water. If there isn't, the trouble does not lie in the controls, for the controls are not to blame if you have to keep the boiler steaming in order to provide satisfactory hot water.

◈

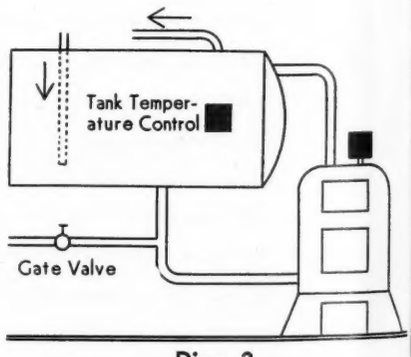
Q. Please give me some pointers to solve this water heating problem, which has baffled the local plumbing, heating, and oil burner talent for more than ten years. I enclose a sketch (Diag. 1) which shows a 18" grate round boiler, fired by a vertical rotary burner, connected to a 400-gallon hot water tank in an institution. A control on the boiler starts and stops the burner. When we set this above 165°, the water runs dangerously hot at times from some faucets. At 165°, the first thing in the morning there is plenty of hot water from all faucets, then suddenly cold water comes from certain hot water faucets. This happens in the kitchen, quite a distance from the boiler room, and raises hob with efforts to wash dishes in proper scalding water. Later in the day the hot water tank is likely to go cold. Then the burner runs about 15 minutes and stops for 20 minutes until, when the hot water demand has slacked off, the tank gradually gets hot again. It's obvious that, while the tank may be undersize, the equipment is afflicted by some technical disorder that cuts its effectiveness.



Diag. 1

R.H.M., *Detroit.*

A. You can improve the installation by adding a tank temperature control as we indicate (Diag. 2). Install a "strap-on" or "surface" type control if there is no tapping halfway up the side of the tank for an immersion control. Wire the new control in series with the boiler temperature control already in use. We prefer both controls to be the 110-volt type, connected in series with the live leg to the oil burner.



Diag. 2

control panel. (This is for safety. Also for safety, make sure the tank has a safety valve of the pressure relief type, or the pressure relief and vacuum-protection type.)

Set the boiler temperature control at 200°; if there is good circulation of water through the boiler, this control never will stop the burner. The boiler will not overheat if the tank chills and the burner tends to run steadily to heat it. Using the

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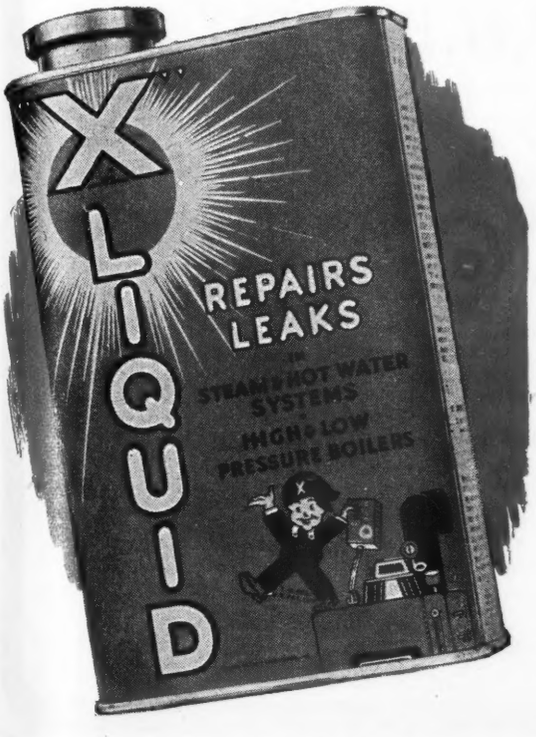

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tank temperature control, the tank will not overheat nights. But when there is a great demand for hot water, the burner should run continuously, not stop for 20 minutes and run for 15 minutes as it does now when the tank is cold. The firing rate must be proper for the boiler capacity, of course. Use a stack thermometer for check-up on this.

Your diagram shows a circulating line, coming back from the hot water supply lines in the building and intended to keep these lines warm when no hot water is being drawn. But you show no check valve arrangement in this line to keep cold water from backing up to the fixtures through it. If there is a hand valve in this line (Diag. 2 shows one), try this: Run hot water fast from several faucets far from the tank, and ascertain the temperature of the water coming from one of these faucets by holding a thermometer in a pail into which you spill the hot water. Then close the valve in the circulating line to find out if this boosts the temperature of the water from the faucet you tested. Also, feel the circulating line, early in the morning before much hot water is being drawn, to find out if it is warm. Feel it in the boiler room, then follow the line back 50 ft. or so out of the boiler room and feel it again. Do the same thing over again later when a great deal of hot water is being drawn; if the line chills then, there is trouble with reverse-flow through it. In other words, the hot water faucets are getting a mixture of hot water from the top of the tank and cold water from the bottom.

Q. I installed the tank temperature control and it does just what you said it would: keeps the tank from overheating nights, and makes the burner run steadily for several hours when much hot water is being used. Because of the great increase in the amount of hot water, the whole building can operate on an improved schedule now.

But the hot water comes out of the kitchen faucets as cool as 110° when the other faucets, close to the boiler room in which the tank is located, give water hotter than 140°. I checked this using a thermometer as you recommended. The circulating line does go stone cold at times, and there is no hand valve or check valve in it; there's a rumor that once a check valve was in this line but defeated its purpose or gave low water pressure to the kitchen before certain rusted old lines were replaced. Much pipefitting has been done since then in efforts to get more hot water, in any event, and I can't tell just how the thing was laid out originally.

Confidentially, the changes made so far, i.e. installation of the tank control, cost the institution only $22, and they make so much difference that the head man will now spend any amount of money to make this water heating equipment perfect. The results obtained already show him we are on the right track. What should I do about the circulating line trouble?

R.H.M., *Detroit.*

A. As the best answer to the circulating line trouble, equip the line with an electric circulator, check valve, and temperature control as our diagram indicates (Diag. 3). Set the control at 130° to start out, and have it wired directly in series with the circulator motor. You'll need no relay for the circulator; use a 110-volt control. Check with the manufacturers of the equipment to make sure that what you install, including the check valve, is suitable for the application. If you want

Six TIMES THE POWER

Multiply the ordinary solenoid valve by six and you get an idea of the powerful lever action developed by General Controls' K-10. This quiet, two-wire, current failure valve is easy to install on air-conditioning combustion or refrigeration equipment. K-10 handles air, gas, water, light and heavy oils, and steam. Positive opening and complete shut-off are assured. Designed for either normally closed or open. Available any voltage. A.C. or D.C. and up to 1¼" I.P.S., port sizes up to ⅜". For specifications write for Catalog

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Fig. F-80

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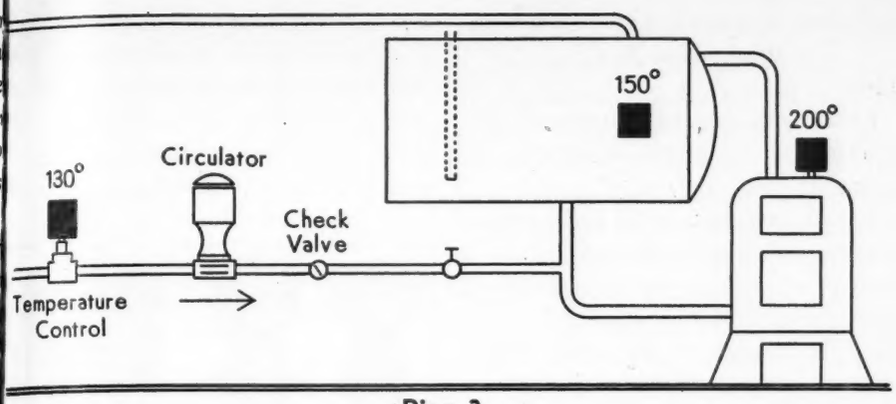

Diag. 3

to be fussy in setting the circulator control, set it so low that the circulator does not run all the time, but starts when this line chills noticeably. On similar applications, the circulators run about four to eight hours total each day.

We are not recommending a check valve arrangement without a circulator because you ask for a 100% dependable answer to the trouble and indicate money can be spent to get it. If the hot water lines to the faucets are undersize, partially plugged, or sloped improperly, even painstaking efforts to end the trouble by installing just a special check valve arrangement (without the circulator) will not be successful.

◈

New Production Demands

(*Continued from page 37*)

"However, demands have been made upon us to increase our war work by taking on new items. All of the items we have in production carry urgency ratings such as 'Priority A—Emergency Urgent.' This means that while we have minimum basic schedules on each item, we are urged to exceed these schedules where possible.

"For our fourth quarter (1944) allocation on burners, we ordered some motors, pumps and transformers, using the AA-3 rating assigned. Delivery promises on these orders are as follows:

Motors .....6 to 7 months
Transformers ..2 to 3 months
Pumps .....No promise as yet
Fans .....No promise as yet

These samples out of a considerable number of manufacturers surveyed indicate the relatively tight position in which they find themselves. Even if manpower were no problem, parts will not be available to make the full quota of burners in the first and second quarters of this year unless there is a drastic change in the present situation.

One of the larger manufacturers of fuel units is reported to have spent several thousand dollars recently to have a duplicate set of pattern made so that it could employ a second foundry's spare capacity to cast pump bodies. When the patterns had been completed the foundry was flooded with war work, and no new castings will be available for several months.

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Readers' Forum

FLUID HEAT DIVISION
ANCHOR POST FENCE CO.
Baltimore, Md.

Editor:

For a good many years your publication has been passing across my desk. Naturally, over such a period of time, much improvement can be expected but frankly I was not prepared for your January issue. Not only is this an exceptionally good number but the cover is easily the best that I have ever seen on the publication. Apparently FUELOIL & OIL HEAT, like wine, improves with age.

M. J. DONAHUE.

◈

FRANCIS K. GLEW, ADVERTISING
Grand Rapids, Michigan

Editor:

Your January 1945 JOURNAL just reached my desk and I want to take time out to congratulate you upon your striking cover this month. It packs power . . . and interest . . . and dignity.

FRANCIS K. GLEW.

PETROLEUM ADMINISTRATION FOR WAR
Washington, D. C.

Editor:

I read with considerable interest your statement on the fueloil situation in the December issue.

I think you did a swell job. I cannot disagree with you on the facts or in the manner in which you have presented them. Certainly your readers will have a better knowledge of the actual fueloil situation after reading the article than they will if they believe in much of the general publicity on the subject.

WALTER HOCHULI,
Director Distribution & Marketing.

◈

NATIONAL WARM AIR HEATING
& AIR CONDITIONING ASS'N.
Cleveland, Ohio

Editor:

We are pleased to acknowledge the report of our Thirty-First Annual Meeting, which appeared in your January edition.

There is just one point I want to call to your attention and that is where you refer to "A record crowd of more than 400 responded enthusiastically—." This is a true statement; however, there were 599 registered for the meeting and I am glad to enclose a copy of the list.

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Managing Director.

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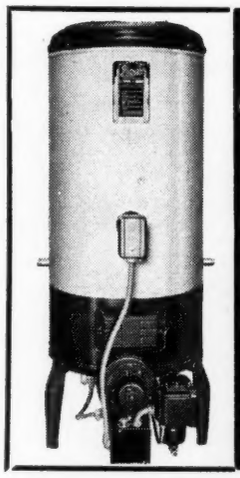

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Recent Ration Amendments

WHENEVER AN AMENDMENT to an existing order is written by a division of a Government agency, it must get four or five clearances at higher levels before it becomes effective. Because these upper levels can't understand what the amendment means any better than can the general public, it is customary to attach a simple statement of the existing situation, why it needs changing and the proposed changes. This is called a "rationale," or some divisions call it a "statement of considerations."

For the first time, starting with ration amendment 41, OPA's fuel rationing group is printing the rationale along with the text of the amendment. These will be printed in the magazine in future.

(If you don't know how to pronounce "rationale," don't worry. In the Fuel Division it is called by various people . . . ration-alley . . . ration-ail . . . ration-ailey . . . ration-al, with short "a").

Amendment 41

PRESENT REGULATIONS

A dealer or primary supplier to whom a consumer or dealer fails to surrender ration evidences within fifteen days after the evidences are due may not make further transfers to that consumer or dealer unless the transferor complies with Section 1394.5712. Section 1394.5712 requires a dealer or primary supplier to whom valid ration evidences have not been surrendered for a transfer of fueloil within fifteen days after they were due to report to the District Office within seven days thereafter the particulars concerning the delinquency.

CHANGE AND REASON FOR CHANGE

This amendment makes clear that before any further deliveries may be made (even for ration evidences paid on delivery) to a transferee delinquent for more than fifteen days, the transferor must have filed the report specified in Section 1394.5712.

Issued this 20th day of January 1945.

Amendment 42

I

PRESENT REGULATIONS

No ration may be issued or used for hot water or domestic cooking or lighting if the applicant has the use of adequate electric equipment for the purpose.

CHANGE

To remove this restriction. This is accomplished by revoking Sections 1394.5153 (d), 1394.5154 (c) and 1394.5161.

REASONS FOR CHANGE

The restriction became effective at a time when most rations for these purposes had already been issued. Reports indicate that the quantity of fueloil that can be saved by this restriction is small and does not justify the discrimination against those applicants who had not received their rations by the time the restriction became effective.

II

PRESENT REGULATIONS

No ration may be issued or used for the operation of a space heater in premises adequately served by central heating equipment.

CHANGE AND REASON FOR CHANGE

The regulations now permit the issuance of a ration for a space heater even though there is a standby facility, provided that certain specified conditions are met. Under the same conditions, the proposed change will permit eligibility to be established where the standby facility is central heating equipment. This is ac-

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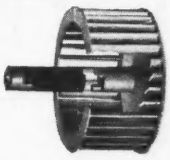

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complished by amending Section 1394.5159 (a) (6).

III

PRESENT REGULATIONS

An additional ration for heating a private dwelling by central heating equipment or any other residential premises by means of a space heater may be issued if the premises are regularly occupied by one or more children less than four years of age.

CHANGE

To authorize the issuance of an additional ration if a child less than six years of age regularly lives in the premises. This is accomplished by amending Sections 1394.5343 and 1394.5344 (b) and revoking Section 1394.5851 (f).

REASON FOR CHANGE

To conform the provisions for additional rations to those controlling the issuance of new and renewed rations in which the change has already been incorporated.

IV

PRESENT REGULATIONS

Provisions is made for re-registration by a dealer who has changed the capacity of his storage facilities.

CHANGE AND REASON FOR CHANGE

To provide for the issuance by the Board of evidences to, or surrender of evidences to the Board by, such dealer equal in gallonage value to the difference between the capacity of his current storage facilities and the capacity of his storage facilities as previously registered with the Board.

Issued this 20th day of January 1945.

Amendment **43**

PRESENT REGULATIONS

A consumer who has a ration for a commercial, industrial or governmental purpose may, upon application to the District Director serving the area in which the consumer's Board is located, be granted an inventory reserve up to the amount of his unfilled storage capacity.

CHANGES

1. To permit, upon approval by Petroleum Administration for War, the granting of the inventory reserve up to the amount of the applicant's total storage capacity and, where the inventory reserve already granted is less than such amount, to permit an increase, the total inventory reserve, however, not to exceed the amount of the applicant's total storage capacity. The District Director, if he grants the application, will specify the grade of fueloil the applicant may acquire for the purpose.

2. To require the application, in addition to the information presently called for, to state the grade of fueloil the applicant is using for the purpose for which the ration was issued; and, if an increase is applied for, the amount of the requested increase; to omit from the application the information now required as to the amount of the unfilled storage capacity of the applicant's storage facilities and the amount of the largest quarterly ration issued to him for the purpose for which his current ration was issued.

3. To prohibit the applicant's acquisition, or storage, for inventory reserve of any grade of fueloil other than that specified by the District Director.

REASONS FOR CHANGE

There are instances in which storage facilities should be more fully utilized than present regulations permit. Whether and to what extent inventory reserves shall be allowed depends upon the location of the storage facilities, the grade of fueloil to be stored and the supply situa-

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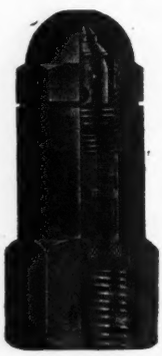

Fig. 246

Right now, "EDCO" production is bigger than it ever was in peacetime. Due to the ever increasing demand for "EDCO" Pumps, Pressure Regulating Valves, Pipe Line Strainers and Spray Nozzles by our Armed Forces, there is nowhere near enough left to meet the civilian demands — but they will be worth waiting for.

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tion. Because of sudden changes in fueloil supply, it is necessary that the approval of Petroleum Administration for War be obtained before an inventory reserve is allowed.

Issued this 20th day of January 1945.

Amendment 44

I. PRESENT REGULATIONS

Application for a ration for a commercial, industrial or governmental purpose must be made on OPA Form R-1102. The ration is issued for a three-month period for the amount needed. Application for a ration for a domestic, institutional or agricultural purpose must be made on OPA Form R-1103. The ration is issued for a six-month period for the amount needed. Application for a ration for domestic cooking and lighting is also made on OPA Form R-1103 or R-1103A but the ration may be issued for any period up to one year. Rations for domestic cooking or lighting may not exceed certain maxima depending on the number of persons served by the equipment. Except in the case of domestic cooking and lighting, rations issued for any of the above purposes are renewed or increased because of a change in circumstances or miscalculation of needs by means of applications for further rations. No deduction is made for ration evidence or ration credits on hand for the purpose when any of these rations are renewed.

CHANGE AND REASON FOR CHANGE

New simplified forms (OPA R-1102 (Revised) and R-1103 (Revised)) have been designed to replace the present forms for the purposes mentioned. OPA Form R-1103 (Revised) will be used only for domestic cooking and lighting, and OPA Form R-1102 (Revised) will be used for all other miscellaneous purposes. Instead of applying for further rations, applications will now be made for renewals in all cases, including those where needs have increased due to changes in circumstances or miscalculation. Ration evidences and ration credits on hand for the purpose will be deducted (in addition to fueloil on hand), when the rations are renewed. Under specified circumstances, renewed rations may be issued for domestic cooking in excess of the maximum allowable.

The new forms and procedure should remove the existing complexities involved in the application, processing, and issuance of rations for domestic cooking and lighting and for miscellaneous purposes.

The changes affect Sections 1394.5352, 1394.5353, 1394.5355, 1394.5356, 1394.5391, 1394.5402, 1394.5406, 1394.5408, 1394.5415, 1394.5501, 1394.5503, 1394.5551 and 1394.5552.

II. PRESENT REGULATIONS

Residual oil is referred to in various sections as fueloil Grades No. 5, 6, and Bunker "C" having an A. P. I. gravity of 20° or below.

CHANGE AND REASON FOR CHANGE

The gravity specification of Bunker "C" oil has been misunderstood to apply to Grades No. 5 and 6 fueloil. To clarify the meaning of residual oil and to avoid repetition of the definition each time the term is used, a comprehensive definition of residual oil is again added to the definitions section of the ration order.

Issued this 22nd day of January 1945.

◈

Arthur S. Davison, well known in the plumbing and heating field in Detroit and recently honorably discharged from the Army, has recently been named direct factory representative for H. A. Thrush & Co., Peru, Ind.

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These attractive, red imitation leather, heavy-board, loose-leaf binders are left over from the old *Fueloil Journal* stock. Unobtainable at this price in wartime. Sturdy steel frame. Holds 12 copies easily. A welcome addition to any library or bookshelf. Convenient. Neat. Protects your magazines.

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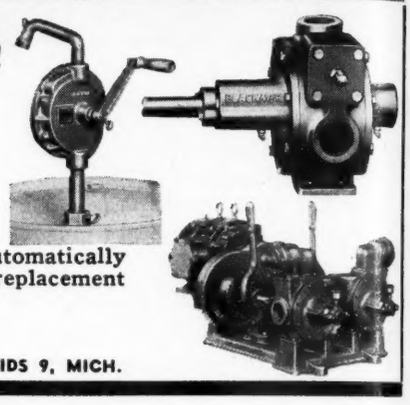
SELF-ADJUSTING FOR WEAR



HAND PUMPS
1½ to 25 GPM. For barrel or tank service.

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50 to 750 GPM
Single or twin.

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35 - 50 - 90 GPM
Double Bearing.

Due to the "BUCKET DESIGN" (swinging vane principle) these pumps automatically compensate for wear. When the buckets are finally worn out, a 20-minute replacement job restores the pump to normal capacity.

WRITE FOR BULLETIN No. 102: *Pumps for the Petroleum Industry.*

BLACKMER PUMP COMPANY 2170 CENTURY AVENUE GRAND RAPIDS 9, MICH.

Gas Headache

(*Continued from page 33*)

the island, throws the supplies into the water and lets them float ashore in the surf. These stations were all oilheated. The burners themselves were waterproofed, thrown overboard and floated in. Oil is thrown over in drums and floats in. How would you like to try that with coal or gas. The kind of gas cylinder light enough to float would only contain a handful of Btu's. With coal, can't you see the boys lined up along the rail, trying to throw chunks over to the beach?

When we were fighting in Africa, the boys were having a lot of trouble with some kind of lice; in fact they carried typhus. Quickly a petroleum product was shot over to them, that spread on their skin kept the bugs away. Of course it kept the senoritas away too, but the medical department was glad of it.

What about the half million oilfired tent heaters that are in use in the big base camps? Those things were originally built to burn coal. But when they used hard coal the stoves would overheat, the stack would get red hot and set the tent afire. So they tried soft coal, but the combustion space was so small that they had excessive smoke and soot, and the little 4 inch stack would fill up. Then it wouldn't stay filled up. Just about the time the boys were settled with their pipes and meditating on the pin-up girls, someone would bump this stack a little, and—whoosh—down would come all the soot, and out through the door and the lid of this tiny stove and the pin-up girls would be brunettes. So they developed a little 10 inch burner for oil, and their oil tank is a five-gallon blitz can. When the boys are out they leave it on low fire, and they come back to a warm tent. The blitz can will keep the stove going 40 hours. Nearly everyone in the Army at one time or another lived in these tents.

We could go on like this with dozens of examples—like the aircraft engine warmer that takes an engine up in the Arctic frozen solid and puts it in shape to run in 15 minutes; or the field kitchens from which they get their food; the field bake ovens; not to mention the pipelines they see being laid up to the battlefields; then all the mechanized warfare equipment, plus the fact that two-thirds of all the cargo going to the fighting fronts is petroleum.

If oil went into this war as something inconsequential in the eyes of those 12 million boys, it's coming out no less than Chief of Staff. In all this time, where were coal and gas?—stay-at-homes. Of course while the boys are away the stay-at-homes may have some dates with their sweethearts. But when the heroes come back, both in the flesh and, figuratively, in the barrels of oil, they'll find most of the sweethearts about as they left them—just as fresh and twice as willing, and they'll marry and settle down.

Everything considered, it's going to be easier to make a living after the war in selling oilheating than in trying to compete against it.

◆

BOWSER, INC., Fort Wayne, Ind., has issued a new piece of literature on "Fittings, Valve and Hose," which shows the company's line of foot valves, fill connections, vents, couplings, hose and nozzles.

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WAR ON FUEL OIL WASTE

Simply spray E-Z, and the soot in fire chamber and flues vanishes instantly. Increases efficiency of oil. One trial will convince you. "EASY" TO USE . . . ECONOMICAL TOO!

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Parts for All Types and Makes of Burners.

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DEGREE DAY TABLES

ONE MONTH ONLY — December Normal	December 1943	December 1944	Percent Change*		SEASON TO DATE (Sept. 1 to Dec. 31) Normal	1943	1944	Percent Change*
1139	1297	1277	+12.1	Albany	2421	2824	2702	+11.6
640	634	741	+15.8	Atlanta	1175	1231	1297	+10.4
852	863	936	+ 9.9	Baltimore	1647	1726	1724	+ 4.7
1000	1097	1062	+ 6.2	Boston	2087	2220	2172	+ 4.1
1102	1188	1228	+11.4	Buffalo	2384	2718	2509	+ 9.4
1108	1163	1336	+20.6	Chicago	2235	2556	2456	+ 9.9
953	1022	1110	+16.5	Cincinnati	1892	2078	2053	+ 8.5
1040	1137	1223	+17.5	Cleveland	2174	2463	2351	+ 8.1
571	633	648	+13.3	Dallas	944	1034	937	— 0.7
1012	927	1001	— 1.1	Denver	2272	2044	2082	— 8.4
1200	1165	1344	+12.0	Des Moines	2424	2579	2396	— 1.1
1120	1167	1250	+11.6	Detroit	2369	2587	2405	+ 1.5
1129	1155	1219	+ 8.0	Grand Rapids	2456	2606	2430	— 1.1
1052	1183	1186	+12.7	Hartford	2217	2469	2444	+10.2
1245	1293	1526	+22.5	Helena	3074	3031	3326	+ 8.2
331	371	380	+14.8	Houston	522	607	535	+ 2.5
1026	1066	1178	+14.8	Indianapolis	2053	2229	2129	+ 3.7
986	1069	1142	+15.8	Kansas City	1877	2110	1866	— 0.6
225	255	164	—27.1	Los Angeles	383	357	385	+ 0.5
875	928	1023	+16.9	Louisville	1677	1780	1805	+ 7.7
1198	1188	1403	+17.1	Milwaukee	2515	2686	2758	+ 9.7
1415	1287	1417	..	Minneapolis	3005	3069	2795	— 7.0
305	349	347	—13.7	New Orleans	477	608	485	+ 1.7
934	1008	1010	+ 8.2	New York	1859	1997	1899	+ 2.2
1163	1150	1289	+10.8	Omaha	2310	2516	2347	+ 1.6
877	925	1013	+15.5	Philadelphia	1697	1827	1828	+ 7.7
979	1021	1161	+18.6	Pittsburgh	2028	2234	2298	+13.3
1172	1366	1277	+ 9.0	Portland, Me.	2602	2924	2817	+ 8.3
729	712	760	+ 4.3	Portland, Ore.	1676	1499	1520	— 9.3
1015	1073	1048	+ 3.3	Providence	2157	2173	2083	— 3.5
917	1006	1142	+24.5	St. Louis	1729	1918	1904	+10.1
1040	1045	1057	+ 1.6	Salt Lake City	2224	2154	2133	— 4.1
426	356	424	..	San Francisco	930	760	1062	+13.2
1373	1435	1420	+34.2	Sault Ste. Marie	3233	3443	3272	— 1.2
708	681	714	+ 0.9	Seattle	1812	1589	1553	—14.3
1090	1206	1315	+20.6	Toledo	2278	2655	2557	+12.2
870	885	947	+ 8.9	Washington	1725	1778	1777	+ 2.9

*Compared with normal.

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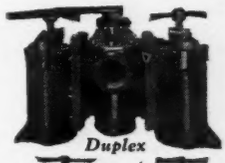
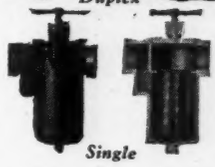
Intelligent engineering is only the starting point. Consistent on-the-job performance over many years provides practical endorsement of KRAISSL design and manufacture.

Class 72 Strainers and Filters



Duplex



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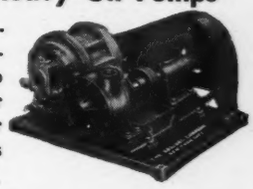
Class 60 Heavy Oil Pumps

Standard equipment wherever independent pump and motor sets or booster pumps for pump-type burners are required.



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Submit your fuel-line problems to KRAISSL engineers—literature and prices on request.

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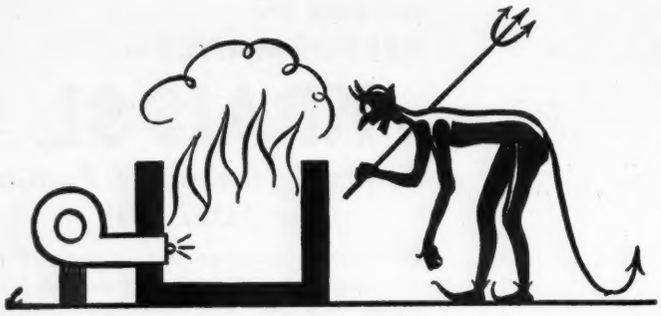

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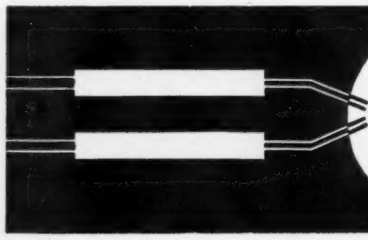

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